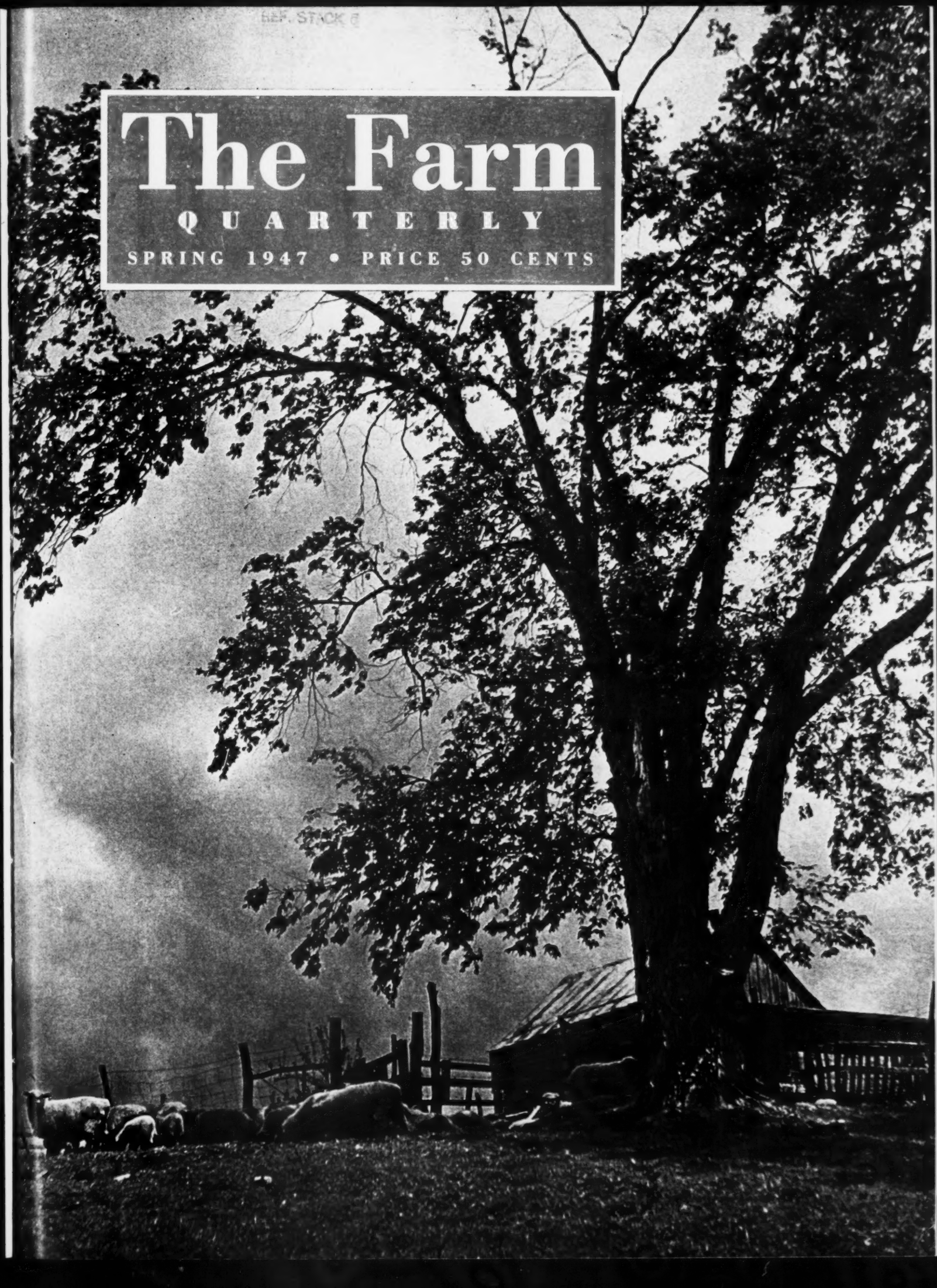
REF. STACK

The Farm

QUARTERLY

SPRING 1947 • PRICE 50 CENTS



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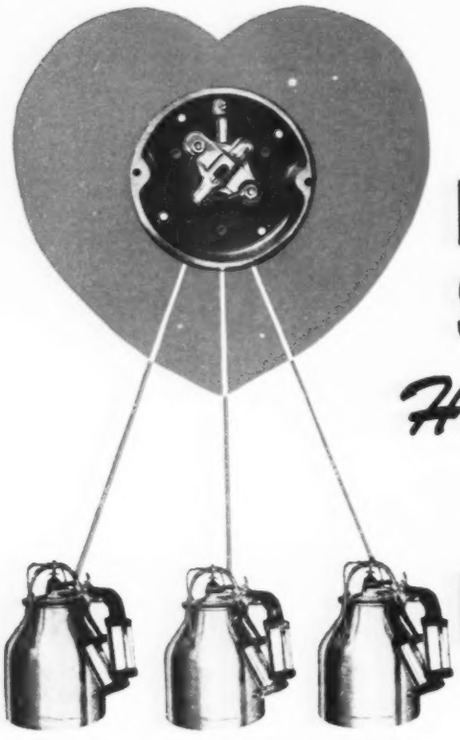


Only the DE LAVAL MAGNETIC SPEEDWAY MILKER *Has the "Magnetic Heart" That Provides* UNIFORM MILKING

Only UNIFORM Milking Can Maintain Highest Production Levels

Milking that varies in speed and action from one milking to another—whether it is hand or machine milking—causes a loss in milk production. Every cow owner has experienced this when changing hand milkers. The cows become accustomed to a certain milking speed and action. When this is changed, whether due to a change in hand milkers or use of a milking machine unit of a type which can vary in speed and action, a production loss will usually result.

"MAGNETIC" milking means *uniform milking* with all cows being milked in exactly the same way at every milking. As every dairyman knows, *uniform* milking . . . milking that does not vary in speed or action . . . results in maintaining the highest level of milk production.

In the De Laval Magnetic Speedway Milker the pulsations of every unit in operation are magnetically controlled by its "Magnetic Heart" . . . the Master Control . . . at the Pulso-Pump. Hence every unit milks exactly the same at every milking and the cow is milked with the same uniform milking speed and action, regardless of which milker unit is used. This is an exclusive De Laval Magnetic Speedway feature. No other method of milking can give your cows milking that is absolutely *uniform and regular.*

PROFITABLE, DEPENDABLE MILKING WITH THE DE LAVAL STERLING MILKER

Thousands of De Laval Sterling Milker users are doing a clean, fast and *profitable* job of milking. The famous Sterling Pulsator *has only two moving parts.* It provides precise, snappy milking action . . . real De Laval quality milking at lower cost. Complete De Laval Sterling Milker Outfits or single or double units for De Laval Better Milking on your present milker pipe line.

THE DE LAVAL SEPARATOR COMPANY

NEW YORK 6 — 165 BROADWAY
CHICAGO 6 — 427 RANDOLPH ST.
SAN FRANCISCO 19 — 61 BEALE ST.

G I

Some thoughts on Food Production...and Safety

INTERNATIONAL HARVESTER

International Harvester has received permission to use the statements quoted on this page, and extends its thanks to:

GMC TRUCK & COACH DIVISION
of General Motors Corporation
THE PENNSYLVANIA RAILROAD
and NEWSWEEK MAGAZINE

1 "In Napoleon's time, it took *nineteen* farm workers to supply food for one person off the farm. Today, *one* farm worker provides food for *four* hungry people elsewhere.

"Early in the last century, it required *sixty-four* hours of work to produce an acre of wheat. Now it can be done in less than *two and one-half* hours.

"This means that the record crops produced in World War II were grown and harvested by 26 million fewer persons than would have been required if early 1800 methods were still in use."

—GMC TRUCK & COACH DIVISION
of General Motors Corporation

• • •

2 "When the Pennsylvania Railroad was founded in 1846, it took three-quarters of the total population to produce food and fiber to feed and clothe themselves and the other one-quarter living in towns and cities.

"Today 25 per cent do that job—and do it better!"

—THE PENNSYLVANIA RAILROAD

THE items at the left, Nos. 1 and 2, from statements published recently, bring a feeling of pride to International Harvester. They remind us of this Company's part in the great record of American agriculture.

The seventy thousand men and women who devote their lives to service under the IH symbol think back to 1831, to Cyrus Hall McCormick and the First Reaper. They think of what the engineers and builders have accomplished in the 115 years that have followed. They are proud of the part this company has played in the advance of power-and-machine-farming—and of what it is building today.

Item No. 3, at the right, is different. It carries a message of warning for every farmer . . . In the coming year International Harvester will do its utmost to provide all farmers with the machines they need. These machines carry many safeguards for safety. Nevertheless, when you use this equipment: Take Time to be Careful. Yours for better living on the family farm.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

3 *Safety on the Farm:* "'Farming is today one of the most hazardous of all occupations,' warned Dr. H. H. Young and Dr. Ralph K. Ghormley of the Mayo Clinic. Making a nine-year study of farm accidents treated at the clinic, they found these included at least 65 serious cases each year. (Note: Of the 17,500 occupational accident deaths in the United States in 1944, 4,300, or 25 per cent, involved farmers.)

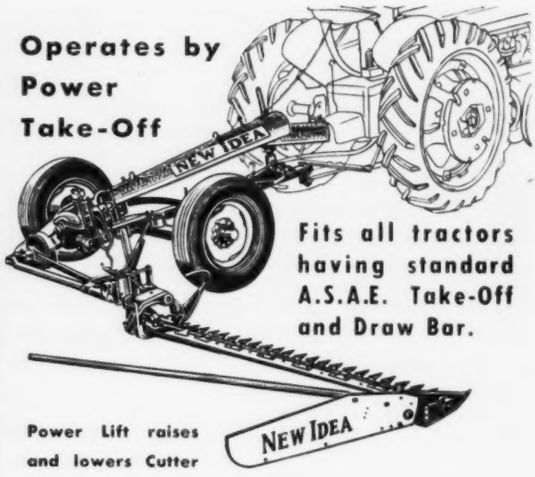
"In this series, falls led all other causes of accidents—most commonly falls from some piece of farm equipment—and they caused a mortality rate of 5 per cent. Second place, with 186 victims, were accidents from farm machinery. The third, with 104 cases, were accidents caused by livestock. Although the bull is generally supposed to be most dangerous, horses accounted for most of the injuries—66 accidents.

" 'The first step in prevention is education in safety methods,' the Mayo doctors said. 'The operation of farm equipment demands as much understanding and respect as the running of a moving locomotive.' "

—NEWSWEEK MAGAZINE, July 15, 1946

HEAR JAMES MELTON • "HARVEST OF STARS" EVERY SUNDAY • NBC NETWORK

NEW IDEA Tractor Mower



Operates by Power Take-Off

Fits all tractors having standard A.S.A.E. Take-Off and Draw Bar.

Power Lift raises and lowers Cutter Bar at a pull of the Trip Rope.

SIDE DELIVERY RAKES

CYLINDER-PUSHBAR LOADERS

STEEL FARM WAGONS

SOON you can get it

Thousands of farmers witnessed demonstrations of this great NEW IDEA mower and decided to wait for it. Now that production is starting, the response has been remarkable — and no wonder.

Here is the handiest, sturdiest, most universal power mower you ever saw — one that works with all modern farm tractors regardless of make or model. Completely self-contained and balanced on its own free-running wheels, it can be hitched and unhitched almost instantly; or switched to another tractor and adjusted in a matter of minutes.

Smooth cutting, easy working, this mower takes sharp turns without a sign of cramping. Thoroughly armored against wear, it is truly *power operated* in every function. Power lift for cutter bar — no "strong arm" levers to tug. Automatic release gives unusual protection against accidental breakage; works promptly when cutter bar strikes any obstruction. Back tractor away from obstacle and bar promptly re-sets itself.

A detailed examination of the NEW IDEA Tractor Mower will reveal many other advantages in addition to those mentioned above. Visit your NEW IDEA dealer soon and have him explain the multitude of desirable features. Meanwhile drop us a post card asking for free descriptive literature on this or any other NEW IDEA machine which interests you.

NEW IDEA

Division — The Aviation Corporation

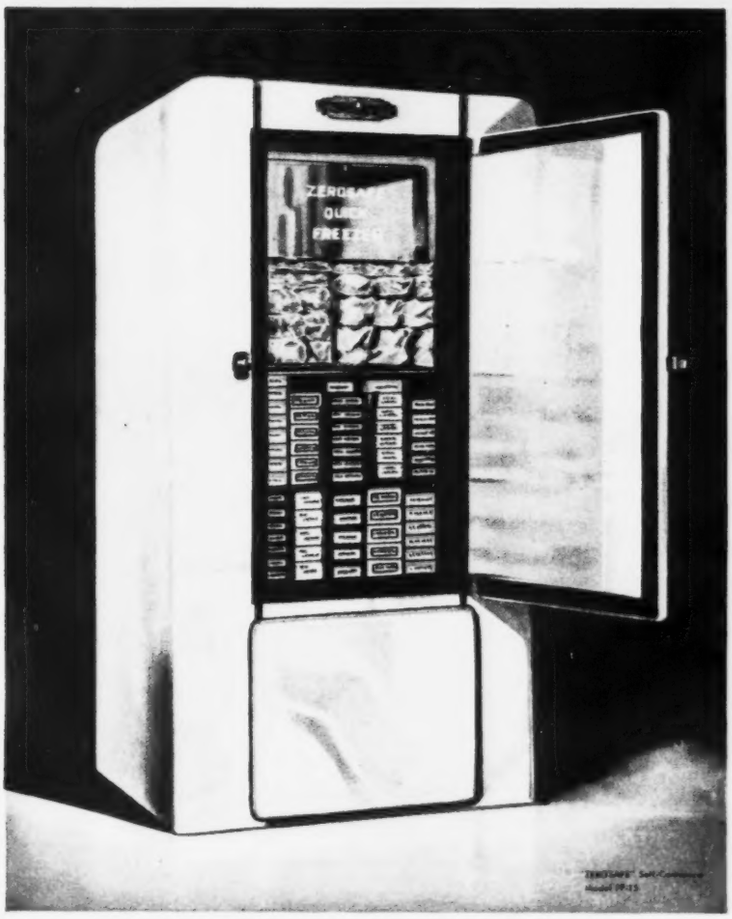
Factories: COLDWATER, OHIO SANDWICH, ILLINOIS

NEW IDEA Haying Machines offer many features of superiority which your neighborhood NEW IDEA dealer will gladly explain on request. Ask him about the famous NEW IDEA Rake with its double-curved teeth and flexible reel; the nutrition saving NEW IDEA Loader; the strong, handy, light running NEW IDEA Air Tired Farm Wagon.

NEW IDEA — INVENTION LEADERSHIP — Est. 1899 — QUALITY — FARM EQUIPMENT

NEW IDEA Haying Machines

WILSON "ZEROSAFE" REACH-IN FARM FREEZERS ARE TIME-TESTED



WILSON "ZEROSAFE" Model FF-15 Farm Freezer. Capacity: Cubic Feet, 15; Food, 525 lbs.

YEARS OF DAILY USE since 1939 by enthusiastic owners of Wilson "ZEROSAFE" Freezers are your guarantee that the New Wilson "ZEROSAFE" is TIME-TESTED in rugged efficiency, durability, and capacity. Wilson's YEARS OF EXPERIENCE bring you the Wilson-pioneered features of front-opening convenience, real usability, long life and gleaming beauty in a complete range of sizes from 15 cu. ft. (illus.) to 120 cu. ft. to freeze and store fresh foods for daily use the year around.

VALUABLE GUIDE FREE

Send your name and address today to Dept. 51 for your free copy of the "Wilson Farm Freezer GUIDE to Better Living", an invaluable booklet on the production of super-quality home-frozen foods.

WILSON REFRIGERATION, INC.
SMYRNA DELAWARE

How about your cows?

Isn't it time that they, too, enjoyed the Safety and Comfort of Surge Milking?

Only the Surge has the lively, intermittent, downward and forward TUG & PULL that holds the teat cups down where they belong . . . that means extra safety, extra milking speed, extra comfort for your cows and extra money for you. The Surge is not sold over the counter . . . it is delivered and installed by a Surge Service Dealer who makes sure that it puts Money Making Milking in your barn.

Surge DAIRY FARM EQUIPMENT

A modern milking machine is a better investment

BABSON BROS. CO.

SYRACUSE • LOS ANGELES • SEATTLE
KANSAS CITY • TORONTO • MINNEAPOLIS
HOUSTON • ATLANTA

BABSON BROS. CO. Dept. 2794, 2843 W. Nineteenth St., Chicago 23, Ill.
Gentlemen: Please send the Full Story about Money Making Milking to:

Name_____ R.F.D._____

Town_____ State_____

Farm's Pictures

The following list, page by page, shows the source of each picture in this issue. When more than one source is represented on a single page, credit starts at upper left to right, top to bottom.

Cover by R. J. McGinnis

5—Joe Munroe. 6—Joe Munroe. 14—Joe Munroe. 15—Stewart Love. 16-17—Stewart Love. 18-19—Joe Munroe. 20—Johns-Manville. 21—Joe Munroe. 22-23—Caterpillar Tractor. 24—Library of Congress; A. D. Baker Co.; Allis-Chalmers. 25—Massey-Harris. 26—Avery; Minneapolis-Moline. 27—Caterpillar Tractor; J. I. Case Co.; International Harvester. 28—Steve Barrett. 29 through 34—Joe Munroe. 35—I. J. Fox Co. 36—Joe Munroe. 37—H. E. Vroman. 38—U.S.D.A.; Joe Munroe. 39—H. E. Vroman. 40 through 45—Carl Mansfield; drainage plan by E. C. Sleeth. 46—Joe Munroe. 47—R. J. McGinnis; Joe Munroe. 48-49—R. J. McGinnis. 50 through 54—Joe Munroe. 55—R. J. McGinnis; R. J. McGinnis; Joe Munroe. 56—Joe Munroe. 57—Herb McLaughlin. 58—Joe Munroe; Carl Mansfield. 59—Carl Mansfield. 60—G. L. Osmanson. 62—Arthur Witman-*Black Star*. 63 — Caterpillar Tractor. 64-65—G. L. Osmanson. 66-67—H. McLaughlin. 68-69—K. Maslowski. 70 — Carew-Caldwell-Monkmeyer; from F. Ambrose Clark collection. 71—Joe Munroe. 72—Beryl Silversteen. 73—F. Knoop. 74—Standard Oil (N. J.)-Parks; University of Minnesota Laboratory. 75—R. L. Turner. 76—W. M. Rittase. 77—H. McLaughlin. 78—Townsend Godsey. 79—C. LaTour. 80—U.S.D.A. 81—V. Fisher-*Black Star*. 82—R. Atkeson. 83—U.S.D.A.; Vachon-Standard Oil (N. J.). 84—C. Mansfield. 85—J. Munroe. 86—Krutch-T.V.A. 88—J. Munroe. 90—R. T. Hayes; CM Long. 91 through 93—Joe Munroe. 94-95—R. T. Hayes. CM Long. 96—Joe Munroe. 97—C. M. Allen. 98 through 100—J. Munroe. 102—CM Long. 124—Iowa State Horticultural Society; B. Silversteen. 140—J. F. Bennett. 141—K. Maslowski.

THE FARM QUARTERLY
22 East 12th St., Cincinnati 10, Ohio

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Fred Knoop.....**Managing Editor**
Mary Berluti.....**Editorial Secretary**
Wm. D. Zaeh.....**Production Manager**
Aron M. Mathieu.....**Business Manager**

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Contributing Editors: **Ray Dunn, Ralph Kenney, Robert Graham, Dave Roberts, Charles A. Reese, Banner Bill Morgan, George D. Scarseth, Myron S. Hazen, B. J. Killham, J. W. Schwab, Charles Krutch, Virgil Overholt, Katharine A. Smith, E. B. Powell, B. G. DeWeese, G. W. Salisbury, J. E. McClintock.**

Volume Two, Number One. Application for entry as second-class matter is pending. Published quarterly by The Automobile Digest Publishing Company, Cincinnati, Ohio. Publishers of The Farm Quarterly, The Automotive Digest, Miniram Photography, Writer's Digest and technical books. Copyright, 1946. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Remit by postal money order or check to The FARM QUARTERLY, 22 East 12th Street, Cincinnati 10, Ohio. Title Reg. Applied for.

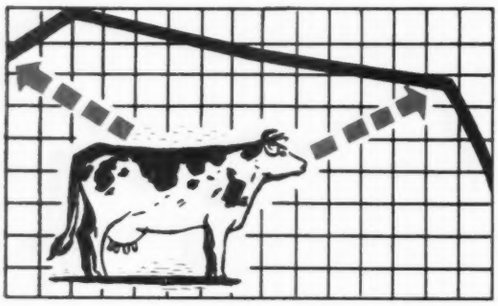
MILK-MASTER

VARI-MATIC MILKING

WILL MAKE YOU *More* PROFIT!

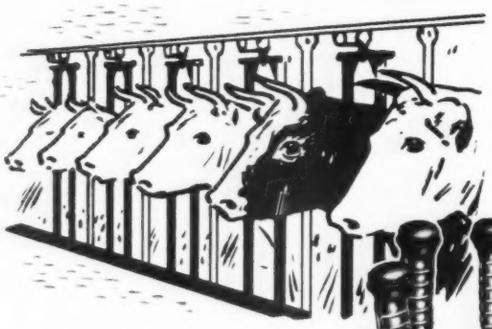
1. More Milk per Milking

There's no magic in more milk per milking. Newly discovered facts prove that fast, comfortable milking gets more milk—by getting all the milk in the udder. Vari-Matic milking adjusts vacuum for each teat according to its need . . . is faster, more comfortable.



2. Longer Lactation Periods

Slow or uncomfortable milking cannot completely empty the udder. In fact, dairy experts say, it's a good way to "dry up" a cow. Fast, extra-comfortable Vari-Matic milking is thorough milking . . . stimulating the cow to longer, profitable lactation.



3. More Cows in Production

With Vari-Matic milking, vacuum is reduced on easy-milking teats to just what is necessary. This careful adjustment of vacuum is more comfortable, more gentle to teats and udders, helps prevent injury . . . keeps more cows in production.

Write for Folder EXPLAINING VARI-MATIC MILKING

The "MECHANICAL BRAIN" which regulates vacuum is located in the branch connection. As soon as milk begins to flow, it maintains or reduces vacuum depending on the effort needed for fast milking.

Perfection MILK-MASTER

PERFECTION MANUFACTURING CORPORATION

2127 E. Hennepin — Minneapolis 13, Minnesota

LETTERS

THAT HOMER'S A REAL FARMER

Sir:

My husband and I are dairy farmers maintaining a herd of twenty milking purebred Holsteins. For two years we have had the leading herd in milk production in St. Lawrence County, so, needless to say we are very proud of our dairy. Our farm consists of 110 acres of good land which my husband loves very much and works constantly to improve. During the war years we maintained a rabbitry of from 300 to 500 animals, the majority of which we sold for experimental work in scientific institutions.

In some future issue of Farm Quarterly I would like to see an article concerning the setting up and keeping of a practical set of books for a farm and, also, a filing system which could be used on farms with a purebred herd.

Homer & Doreen Martin,
Lisbon, N. Y.

HORN ELEVATION OF COWS

Sir:

I have just finished reading your article concerning the relation between milk production and the angle that the cow's horns protrude from her head. Frankly, I think somebody is pulling my leg. To a poor logical engineer this horn adjustment idea is something akin to adjusting the angle of the radiator ornament in order to increase the gasoline mileage of an automobile.

In view of the fact that we weight the horns of beef cattle, I expect, any day now, to see a herd of dairy cows with helium filled balloons tugging away at their horns.

To top it all off, Dr. E. L. Dakan (Page 8) of Ohio State University credits it all to mysterious chromosome unions which create "heavy water." Our physicists should be interested in this new source of "heavy water." They encounter considerable difficulty in manufacturing (H_2O_2) "heavy water." Perhaps I should assume that the "heavy water" gravitates more rapidly, causing the increased milk production.

The article convinced me of one thing: Telesphore Plourde's "Lulu" must have had a pretty tough life having her horns adjusted every month until she died from sheer overwork.

This farm boy who went to the city thinks the *Farm Quarterly* is the most valuable farm magazine being published.

James F. McCord,
General Motors Corporation,
Delco-Remy Division,
Anderson, Indiana

Here's Why You Should Buy the New Firestone CHAMPION GROUND GRIP

1. IT CLEANS UP TO 100% MORE EFFECTIVELY
2. IT PULLS UP TO 62% MORE
3. IT LASTS UP TO 91% LONGER
4. IT GIVES A SMOOTHER RIDE AND WEARS MORE EVENLY ON THE ROAD
5. IT IS THE ONLY TRACTOR TIRE THAT TAKES A "CENTER BITE"
6. IT IS PATENTED— IT CAN'T BE DUPLICATED
7. IT COSTS NO MORE THAN ANY ORDINARY TRACTOR TIRE

SPECIFY FIRESTONE CHAMPION GROUND GRIPS WHEN YOU ORDER YOUR NEW TRACTOR

OUT CLEANS OUT PULLS OUT LASTS

Any Other Tractor Tire

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INDIANA CERTIFIED SEED WINS AGAIN

1st PRIZE
1946
OFFICIAL STATE
YIELD CONTEST

farmer, of near
unty, 1946 Corn

IN THE OFF EST, INDIANA
CERTIFIED H D
174.5 B per
170.7 ls pe
11 wi
32 of re and over
309 s per acre
41 ushels per acre

1st

INTER NS

Newton L. Halterman,
International Corn ken from an Indiana
Certified Hybrid 8 ified.

Thomas Fisher, Shelby
Son of Charles N , also used Indiana
Certified Hybrid

The above result act that Ind plant more Indiana
Certified Hybrids th other hybrids combine

SOY BEAN WINNERS—Use Certified Seed

George M. Shell, Anderson, Ind., R. R. No. 5
State Champion—2-Acre yield Official contest with a yield of 55 Bushels per acre. Mr. Shell used Lincoln Certified Soy Beans and planted them in 40-inch rows.

DEMAND THIS TAG ON EVERY BAG

Grown by farmer seedsmen for progressive farmers. Write for name of your nearest producer.

IT'S A JOKE IN SOUTH CAROLINA, SON!

Sirs:

We attempted to elevate our cow's horns in the manner described by Dr. Gould in your Winter issue. Using our best bat, we rapped at the horn but hit the cow's eye instead.

Will you please advise proper treatment for a bat-eyed cow?

John McCall
Cowpens, S. C.

Dead pan humorist John Gould, author of the horn elevation hoax (tipped off to readers by the two letters in the same issue on page 8), is better known for his best seller "Farmer Takes a Wife." He edits the Libson, Maine, newspaper and before that made his honest living as a farmer.—Ed.

WORTH 1,000 WORDS

Sir:

After looking over the Winter copy of Farm Quarterly, I could not resist writing you to tell you what a fine publication you have.

Under the name of Dever Timmons I have been a photo pictorialist and salon judge for many years and I feel that Farm Quarterly pictorially tops even the American publications devoted exclusively to photography. I think you have set a new high for all magazine publishers, regardless of field or subject.

Dever Timmons, F.R.S.A.
The Buckeye Fabric Finishing Co.
Coshocton, Ohio.

59 YEAR OLD THRESHER STILL GOOD

Sir:

I was especially interested in your horse-powered threshing machine pictured on page 44. I own a threshing machine similar to the one illustrated. My machine was purchased in 1887 by my grandfather and this machine is 59 years old. It is still in good condition as it has been stored in a machine shed all these years. I've never used the machine myself as I cut and thresh my wheat with a combine and tractor.

My grandfather was one of the pioneers who brought hard winter wheat from Russia in 1876. He was a German, came to Kansas with other Germans from the Crimea in Russia to settle in Ellis County, Kansas. These Germans were the first to introduce Turkey wheat in Kansas.

Alban Leiker,
Walker, Kansas.

"OTHER THAN DOLLARS AND CENTS"

Sir:

After reading Charles A. Reese's "Honey In The Comb" I am starting an apiary on a little farm we own, and would appreciate any story you print on bees, and their care.

Oh, yes! I would like to say here to Mrs. C. W. Stripling, who asked when a farmer's wife received her vacation. The only way you can have a true vacation now-a-days is to be a farmer's wife.

With prices the way they are now it takes all a city person can make and save for a year to go on a vacation.

But the farmer's wife, now, she can open a pantry filled with home-canned food, there is a yard filled with chickens, a smokehouse full of meat, a cellar filled with fruit and other home made commodities, a garden for vegetables, and a cow or two for milk and butter.

It is a vacation, Mrs. Stripling, to pack a basket with home grown food, walk across your own pasture, wade your own creek, spread your lunch under your own trees, and thank your own God for all your blessings. Yes, it is a vacation from the deprivation and struggle millions of city-bred women are suffering today. And there is a deep satisfaction from doing things for yourself with your own hands, that nothing else can give you.

How do I know, you say? Well, I was reared on a farm, and finally got back to one.

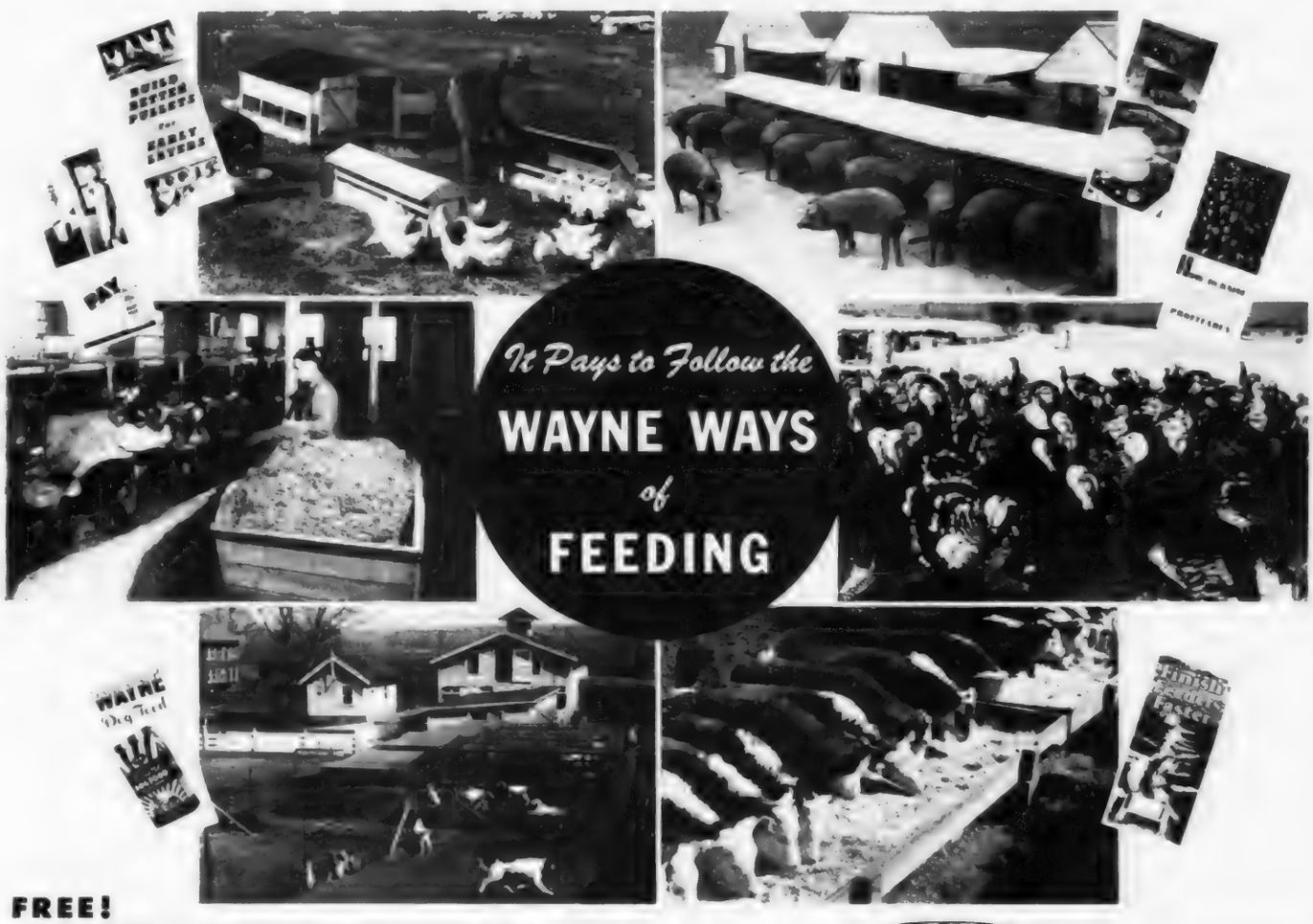
And God willing I will rear my small son and daughter on the farm.

Mrs. R. E. Jones,
Monroe, La.

Proof of DEPENDABLE *Performance . . .*

Results tell the story . . . 16,252 cows fed by Wayne users in Dairy Herd Improvement Associations showed an average yearly production of 10,068.6 pounds of milk and 421.3 pounds of butterfat . . . 1,524,660 Wayne-fed chicks in 5,046 flocks in 32 states, under varying conditions, showed an average of 96.7% livability and 20.5 ounces of weight on only two pounds of Wayne Chick Starter . . . records on 28 farms showed 301 Wayne-fed sows weaned an average of 8.4 spring pigs per litter—37% more than the national average! Results like these point the way to better, *more dependable profits on your farm*—so see your Wayne Dealer now. He's friendly, well-informed . . . and especially trained to help you get the *dependable performance* that proves "It Pays To Feed Wayne!"

ALLIED MILLS, INC., General Offices: Chicago, Ill., Service Offices: Fort Wayne, Ind.



FREE!

Allied Mills, Inc., Ft. Wayne, Ind.
SEND FREE FEEDING INFORMATION ON:
CHICKENS ☐ TURKEYS ☐ CALVES ☐
HOGS ☐ DAIRY COWS ☐ BEEF CATTLE ☐
Name_____
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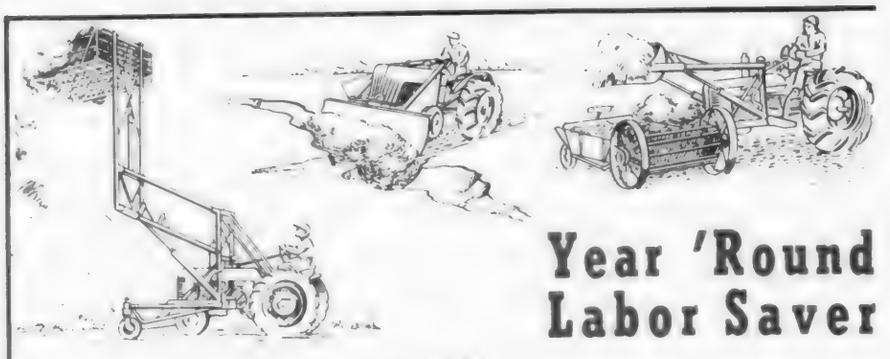
WAYNE FEEDS

"FULL STRENGTH" Rations for All Poultry & Livestock



Year 'Round Labor Saver

The "Ottawa" Hydraulic Front End Loader makes your tractor pay its way all year; enables you to get tough two-day jobs out of the way in a few hours. Loads bulk materials, moves heavy objects, stacks hay, scoops grain, plows snow. With an "Ottawa Farmer" and its attachments you save time, money and manpower... Winter, Spring, Summer and Fall. The Ottawa is interchangeable on 27 tractor models. Write for fully illustrated descriptive folder today. Every Ottawa Loader is sold under a money back guarantee.

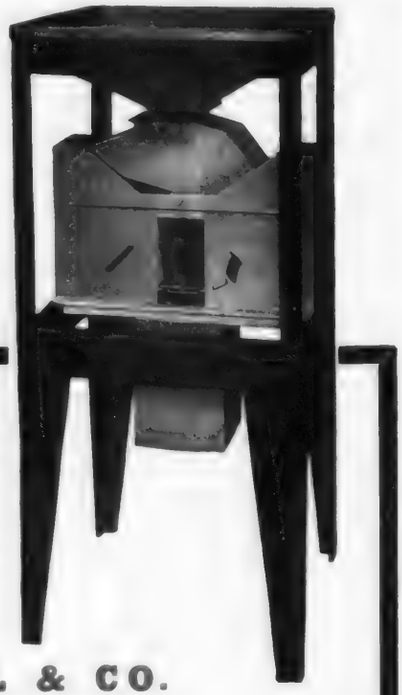
The Ottawa FARMER HYDRAULIC FRONT-END LOADER

Ottawa STEEL PRODUCTS, Inc.
OTTAWA, KANSAS • U. S. A.

The
CLIPPER ROCKER

Introducing

AUTOMATIC
Farm Model
SEED TREATER



Ideal for your modern farm, this is the Treater you'd build for yourself for dry chemical treatment of beans, grain and seeds.* Easily operated by gravity, *no power is required.*

And . . . this handsome, reliable machine sells for only $75 net, F.O.B. Saginaw. Write today for circular, or send check for immediate delivery.

*(will not handle un-delinted cotton seed)

A. T. FERRELL & CO.
SAGINAW, MICHIGAN

FQ EDITORS ARE ALL BOARS, THANK YOU

Sir:

We have in the past three days received both the summer and autumn issues and have glanced through them. Our first glance has been a pleasure such as looking quickly at a champion There is, as we would say, real boar or gilt, "herd material here".

Someone wrote and said they hoped you would soon make "Farm Quarterly" a monthly. We do not agree. As it is, it is just about perfect.

The article on "Wish Book 1910" has been an education to the children.

The article on "wheat" in the Autumn issue, especially the pictures of the men and beasts and machinery, bring a lump in the throat. They are memories, never to be forgotten.

The pictures on strip contour cropping with the horses in the field are a revelation. We have this year turned our farm into strips on the contour.

That hog, freshly butchered, and casting a shadow on the farm floor, the farmer drinking from a jug, sun through the tines of an upturned pitch fork, all mean something to the man who has experienced those same scenes and jobs

We raise purebred duroc swine.

Frank Kearney,
Lodi, Wisconsin

FUTURE FARMERS OF AMERICA

Sir:

I hope that the day will come that you can afford to make a real concession to High School Agricultural Students. Get it to the boys and the parents will go with you by the thousands Today we have some 300,000 pupils in Vocational Agriculture and the way I feel it is a loss to the boy if any of them fail to have access to your magazine. At least I hope every school in the Country will subscribe to your new periodical.

Here are three subscriptions, the first of many, that I have for you along with a check for the same. If possible start the boys with the Summer issue. If you have no more Summer issues available, start them with the Fall number which I can hardly wait to receive Good luck to you and your splendid work

Boyertown Future Farmers,
Ralph S. DeTurk, Supervisor
Boyertown, Pennsylvania

WISH JOAN WERE OUR DAUGHTER

Sir:

I have read most of the farm magazines published and have always found them lacking in some way. Your magazine seems to fill all the requirements, at least for me. As you show that farming can not only be productive but beautiful as well.

I'm 18 and have lived in town all my life, except for short visits to the country. I know little about the farm. But I have always wanted to live on one and still hope too.

I've tried to gather information about the farm and farm life from books, magazines and people, but never succeeded to well. In only three issues of the "Farm Quarterly" I have been able to learn more than I've ever learned before.

I haven't been at it too long but I had begun to think that the only way I could learn was by doing. Now I have your magazine to help me choose between the probable and the improbable.

I have always thought that farming, as my Great Grandfathers did—orchards, kitchen gardens, bees, etc.—only using modern equipment, of course, was the way to make living in the country worth while.

Your magazine has carried that idea out with common sense. Which is, of course the reason I think its wonderful.

Joan Crowther,
304 South 11th St
Salina, Kansas

TOMORROW'S FARM POWER IS HERE *Today!*

Meet the forerunners of a new age in power farming—the *new* John Deere "A" and "B" Tractors! They bring you *new* performance, *new* ease of handling, *new* comfort you've never experienced in other tractors.

New, more efficient Cyclone Engines—in *both* regular all-fuel and high-compression gasoline types—deliver a ready flow of eager power on every job . . . new hydraulic Powr-Trol raises, lowers, adjusts drawn and integral tools at a touch of your hand . . . new, adjustable, deep-cushion seats and roomier platforms greatly increase your comfort . . . new, built-in starter and automatic choke make starting easy . . . new, automatic crankcase ventilation system requires no servicing.

These and many other new features, plus the greater economy, greater dependability, and longer life advantages of exclusive John Deere Two-Cylinder Engine Design, offer you the utmost in tractor value. Your John Deere dealer will be glad to give you further information, or write to John Deere, Moline, Illinois.

New John Deere "A" and "B" TRACTORS WITH *Cyclone* ENGINES AND 20 NEW FEATURES

OTHER *NEW* JOHN DEERE MACHINES ARE HERE OR ON THE WAY

A new Automatic Hay Press . . . a new Self-Propelled Combine . . . and a new Model "M" Tractor for smaller farms are among a host of entirely new and ultra-modern machines and implements which John Deere has developed. Some are coming off the assembly lines now, others will soon be in production. So, keep in touch with your John Deere dealer and be sure to wait and see this new, quality equipment.

JOHN DEERE
MOLINE ILLINOIS

Service TO AGRICULTURE

Seagram your partner in Agricultural Progress!

View of Seagram Nutrition Farm near Louisville, Kentucky

Seagram is proud of its privilege to be of service to American agriculture, first, as a unit of an industry which utilizes premium farm products and second, as a grain processing organization which returns to the farmer the original grain proteins supplemented with fermentation growth factors. In these two ways Seagram completes the natural agricultural cycle which helps to stabilize the farmer's economy and aids in the conservation of his resources.

The feeding of distillers' grain products is no longer in the experimental stage. Seagram, through its plant research facilities and its Nutrition Farm, has proved that distillers' grain products can be used to an advantage as nutritional supplements in farm animal rations. At the farm, nutritional experiments are being conducted continually with chickens, turkeys, hogs and beef cattle. The results from these experiments provide information for the most effective way distillers' grain products can be used in supplementing farm animal rations. As a nutritional service, Seagram will be happy to provide information on the use of its grain products to balance your feed ration.

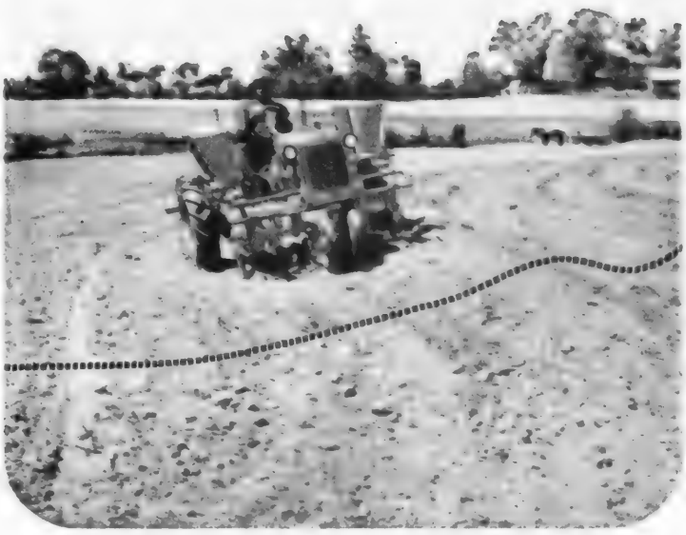
JOSEPH E. SEAGRAM & SONS, INC.

Box 240

LOUISVILLE 1, KENTUCKY

LOOK AHEAD

The KEY To Contour Farming



Follows the Contour of the Ground

Handy dual control levers gauge the exact depth of right and left gangs independently. Even on terraces, back furrows or dead furrows, you can place seed and fertilizer at the desired depth.

Cornbelt colleges and experiment stations predict a new and better corn growing system, based on contour tillage.

Advance U. S. Soil Conservation Service reports indicate a national average yield increase of 11 per cent to date for contour-cultivated corn.

Allis-Chalmers FRONT-MOUNTED implements with DUAL DEPTH CONTROL make contouring a real possibility for the average farm. A planter and cultivator mounted *ahead* of the driver's seat make it easy to follow a curved row.

Seed and fertilizer can be placed at precise depth, in contour rows that catch and hold moisture on the slope. Rotary hoe cultivator attachments roll directly over the row, lifting out weeds. Fewer young crop plants damaged by cultivator shovels mean a higher stalk population per acre.

These are methods recognized as setting a major new trend in agriculture. Allis-Chalmers "looks ahead" to better living for every family farm.

ALLIS-CHALMERS TRACTOR DIVISION
MILWAUKEE 1, U. S. A.

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

Pre-fabricated metal buildings have been made for almost forty years, and there are types for every farm building purpose. You can buy them knocked down, or the manufacturer will erect them.

GOOD FOR LIFE

They are punching metal buildings off assembly lines today much after the manner of automobiles. These prefabricated metal buildings are available for every farm purpose, and there are three practical reasons why it's thrifty to own one. First, with reasonable care and small upkeep they last a lifetime; second, they reduce the fire hazard; third, it's cheaper than the same building made of wood construction.

Prefabricated steel buildings differ from an ordinary farm building because they are manufactured to a fixed design, and are made from sheets of steel bolted or nailed together. The length is variable from about 20 feet to as long as the Empire State Building laid on end. Although there can be no alteration in design, the manufacturers provide for a choice in location of doors and windows and for different sizes.

Some twenty firms manufacture metal farm buildings, and a few of them have been at it since grandfather's time. The old line firms, such as Martin Steel Products, developed through engineering and research a complete line of metal farm buildings that are practical and designed to fit the farmer's needs. Then, of course, there are war blown corporations which are selling Army rejects to the farmer by mail; but great names in the steel industry such as Great Lakes Steel, whose Quonset hut is known all over the world, engineered and adapted their war developed buildings for farm use.

Steel grain bins and corn cribs have been made for almost forty-five years and the farmer knows what to look for in them, and that most "good farms" use them. But metal tool sheds, barns, work buildings, and cattle shelters, although available generally for almost as many years, are not as well understood.

There are many different kinds of prefab metal buildings—different in structural strength, galvanizing, and adaptability to farm use—although save for the Quonset they look superficially alike. You can buy them by mail, from Sears and Montgomery catalogues, from farm implement dealers, and direct from at least one steel fabricator in every state in the mid-west. And, just as you guessed—they're good or cranky or in-between.

One Man's Story

"Steel Buildings? They'll do."

That's the way Harry Olander of McKeesport, Iowa, expressed himself when we stopped to talk to him about the shiny new building he had beside his wooden barn. "How come you bought it?" we asked.

THIS PRE-FABRICATED STEEL SILO is 12 feet in diameter and thirty one feet high, not including the cupola at the top. It holds 76 tons of silage (3535 cubic feet) and costs $990 erected, requiring 2 men four days. The inside is coated with black asphaltum paint, before erecting. Afterwards the inside should be oiled each season. Old crank case oil is OK. The outside is painted with aluminum paint, and the manufacturer, Clayton & Lambert, advise that this silo should be painted every 5 years.

The price with skip-doors is $60 less but if you do the climbing and shoveling yourself, it's easier on the back to part with that extra sixty.

The farmer in the center, Howard Jones, Twin Creek Farm, Maud, Ohio, is loading manure with a power loader attached to the front end of his tractor. He lifts a yard at a time without taking the pipe out of his mouth.

AN ERECTION CREW assembles the framework for a Quonset 24. Men atop the framework are tightening bolts which secure the purlins—the horizontal supports—to the arch ribs which form the first unit of the building. Steel for the framework has been factory cut and drilled for quick assembly. Temporary wooden braces keep the frame rigid until the connecting section is attached. The 48-foot-long building will have four of these units. The f.o.b. price is $1,087.00, plus erection which is about $1,000 depending on insulation and extras. Meanwhile on the concrete slab below, two other crewmen are assembling rib sections and laying them out preparatory to raising. Foundation measurements and spacing of anchoring bolts must be exact because steel won't give.

Harry Olander stooped and pulled a shoot of timothy from the barn yard. He grinned. "An advertisement I read said: *'Buy your buildings like you buy your feed*—sacked and *ready to use.'* I answered the ad and ordered a building. The photograph of it was just like what I got," and he waved to the roomy tool shed, "plain lines, 32 feet by 42 feet with a little gable on the front and back. The price was $975.86 and the only other cost I had was the erection. The advertisement said two men could do it. Yeah, Paul Bunyan and his big brother!

"When the building came, the trucker just spread it out on the ground and went away. That steel didn't look like it was worth 500 bushel of corn or twenty-five acres of wheat ready to be combined.

"Belle, my wife, didn't say anything when she looked at it.

"Nine hundred and seventy dollars is just half the cash savings we were going to put by in 1946. There it lay, flat-foot on the ground.

"In the Army they put up buildings like mine in a day. The Sergeant orders out twenty men and the building goes up like a Tinker Toy. But I couldn't do it that way. There was a strike on in the Waynesburg roundhouse so I was able to hire four colored laborers to help me out.

"That's something not to do: common labor isn't for erecting prefabricated metal buildings, unless you're with them all the time, and unless you know one hell of a lot about how to do it. If I had the experience behind me of putting up a few prefabricated metal buildings, I think I could boss a gang of 4 Chinamen and put up a building in a day. But the first time around is no time to do it with common labor. Trade off work, if you can, with a neighbor farmer. He'll be handy with a wrench.

"Naturally, if your farm income is big enough so that you can afford it, let the manufacturer erect the building. Or, second best, get him to supply a foreman. If you have a small farm of 100 acres or less, and can't stand the extra expense of say, three hundred dollars between the manufacturer doing it, and your doing it, pay extra for skilled labor that knows metal. The tolerance with metal is much closer than with wood. The prefabricated parts have to fit. Each piece has a hook or an eye, or a peg, or screw hole, that must fit exactly with the next piece and so on. If the last piece doesn't fit, you'll have to wire it to the final girder, instead of bolt-

MOST PRE-FABS are erected from a concrete foundation because it gives a better floor to the building and prevents wind and water from drifting in between the bottom of the side wall and the earth floor. However, semi-open field animal shelters are sometimes erected on concrete posts.

ing it. There's no putty to stop up cracks. All the metal parts overlap, and they have to fit like meshed gears. If a door sags, you can't plane it down.

"I just naturally like my floors a little higher than the ground. So I put down a concrete floor, 32 x 42, and made a little wall five inches high all around it, and hitched the girders to the spikes that I inserted into the wall about two yards apart.

"My building came without any provision for gutters, door stops, inside wiring, rain spouts, hardware on the doors, or ventilators in the roof. I never thought of any of these little things either until the building was up, and I saw I *didn't* have them. Each one cost more money than I planned to spend. Some of the prefabricated buildings people are buying around here are unchanged from the war. They aren't made especially for farm use.

"Mine has four big doors, each 12 feet high, which is fine and lets in a 10'6" hay loader. The gable of the building is roomy and will hold 70 bales of hay, on a platform I built under the gable. There were louvres to provide ventilation for the hay but there was no metal shelf provided by the manufacturer to build a storage platform under the gable.

"All I'm trying to say is, farm buildings should be for farmers; some of 'em are; some aren't and mine is just an Army depot that I made over."

"Satisfied with it, Mr. Olander?"

"Yep. She's good for life."

Mr. Olander's experience suggests that a smart farmer can always find his way out of the woods and that only mechanics should be bargain hunters.

3 Check Points In Buying A Pre-Fab

In erecting a metal pre-fab, select a firm actually dealing with farmers; second ask for the address of a farmer who bought the kind of building that interests you and inspect it. Within a 3 hour drive of every locality in America, are various metal farm buildings; and of course there are grain bins and corn cribs in every county. A personal inspection of the general kind of pre-fab building that meets your needs. and a talk with the farmer who owns it, is worth the time. Third, if possible, have the manufacturer erect the building, or supervise it.

An important difference between the kind of a building you may select through this method, and the various pre-fab buildings freely offered to the public for "all-purposes" is that the manufacturer or dealer of the former has met and solved the farmer's problems on hundreds of previous occasions and has adapted his designs to suit them.

How Much Does it Cost?

About half the cost of a prefabricated steel building is the flat steel itself; the other half includes the erection, the extras, the labor and the freight. With wooden barns, labor and erection is about one fourth the cost.

Farmers think of buildings mostly in

IT'S TRAVELING on the expensive, but conservative side, to let the manufacturer erect the pre-fab structure. On the silo pictured on page 14, the erection charge was $190 (and the silo $800). This worked out to $3 an hour for labor, something no farmer can afford if he can do it as well himself. Of 15 farmers interviewed who bought steel pre-fabs, 12 said it was best to let the manufacturer erect it; three said they did it themselves at 10% the cost (figuring no out of pocket money for their own time). Of the three, two were former builders, and one watched a pre-fab go upon a neighboring farm first, under the manufacturer's direction, and then hired the foreman for one day for $20.00.

DETROIT PUBLIC LIBRARY

PRE-FABRICATED METAL buildings are used for every farm purpose. Among the various kinds are: grain bins, corn cribs, hay makers, brooder houses, laying houses, hog houses, silos, barns, tool sheds, grain elevators, and semi-open animal shelters. Shown here are two silos and corn cribs and a hay storage tank. The farmer is sending the metal loader into the barn to pick up manure.

connection with animals, rather than for tools or grain alone. And while pre-fab buildings make their appearance in force on American farms, a lot of old superstitions have to be forgotten, and new scientific methods put to work.

Laying the Ghost

Providing shelter for stock from rain, sun, snow and wind is only half of a farm building's job. The other, and often more important—half is to create healthful, indoor living conditions for animals and to protect stored crops from spoilage. No farm building can give the right kind of service when its interiors "sweat" or "frost".

An unheated metal farm building can be completely safe from condensation in any form when the original cause for condensation is corrected at the time the building is erected. A finished steel building whether it be barn, tool shed, corn crib, farm garage, silo or chicken house is cheaper than any wood building of similar size and construction*, and the steel building lasts longer with less upkeep and less fire hazard. That is why the practical problem of correcting the cause of condensation in steel buildings should be understood by every farmer.

Only three factors are essential to the control of atmospheric conditions in an unheated metal farm building. These are insulation, ventilation, and vapor barriers. If condensation is to be eliminated completely, and this has been done in literally thousands of buildings now in farm use, a combination of the three needs to be employed. These subjects are new to many farmers and their importance to farm construction is just beginning to be appreciated. Let's see what these terms mean.

The main function of insulating material is to slow down the flow of heat. Heat always travels from a warmer to a colder area. Where there is a higher temperature on one side of a wall than on the other there will be a flow of heat through the wall. The purpose of the insulating material is to slow down this flow of heat. Materials that conduct heat slowly are good insulators. Insulation properly installed keeps a building warmer in the winter and cooler in the summer. It also prevents sweating and frosting on the building surfaces.

Ventilation

Ventilation is any system used for admitting fresh air and carrying off stale air and moisture. Because steel buildings are tight it is easier to control the ventilation in them. This is done by means of windows, flues, or, in a case of barns or poultry houses, through the use of thermostat control fans.

Vapor Barriers

All air contains water in the form of vapor. A cubic foot of air at 90° tempera-

*Assuming the wood building is made from mill purchased lumber, not wood lot lumber, and when the labor is supplied by a town contractor; not traded off.

THIS WELL INSULATED pre-fab milking parlor has room for eleven cows, Guernseys to you. By estimating the warmth that cattle will give off (see table page 20), the area inside the building and its probable humidity and temperature, and knowing the lowest temperature to provide against outdoors, building engineers can name the amount of insulation needed to prevent condensation. This is done with a standard point system; see graph page 20. The nicely brushed, fluffed and washed out tails of these cows are right where the critters will lay them every time . . . with or without insulation.

ture may contain 14.79 grains of water. A cubic foot of air at 50° temperature will hold only 4.07 grains of water.

When air at 90° temperature holding 14.79 grains of water for each cubic foot suddenly comes in contact with a surface of 50° temperature then the vapor in the air instantly condenses and forms little droplets of water on the cold surface. This is called condensation and it is this natural phenomenon that turned some farmers against steel buildings.

Condensation may occur on the inner surfaces of a building or it may occur within the wall or roof of the building. In order to guard against condensation on interior building surfaces, the proper thickness of insulation should be used. The second problem, condensation within the walls or ceilings of a structure, can be corrected by the use of vapor barriers.

Vapor barriers are of two general types, (1) a paint or liquid type applied as a finish on the interior surfaces and (2) the duplex papers or sheet types installed on the inside face of the studs before the interior finish is applied. Of the first type, aluminum, asphalt and varnish are among the most efficient. In the second classification duplex or laminated paper, smooth surface roll roofing and aluminum foil are among the best vapor barriers.

Outside Paint Helps

There are a number of commercial paints which, when applied to the outside metal surface of the building, reflect the sun's rays, so that the amount of heat passing into the building is sharply cut down. White or aluminum paints do a fair job. But, during the war new paints were developed by several companies which contain pure asphalt, asbestos and aluminum. The asbestos in the paint gives the surface an uneveness that reduces glare. One of these paints is called Alumi-Shield and it is manufactured by the Paraffine Companies, Inc. When applied to a metal building they say it reduces interior summer temperature by some 15°. One gallon covers 300 square feet on metal and the cost of a gallon is $3.30. Alumi-Shield is applied with any kind of a wide brush and the brush is valueless after using.

This type of paint is black in color, but the instant it is applied the aluminum floats to the top and so the surface color is that of aluminum.

Animals Create Heat

The purpose of ventilation, insulation and vapor barriers in metal farm buildings in which animals are housed is chiefly to

COMPARATIVE COSTS
OF FARM BUILDING 32′ x 42′ IN WOOD AND STEEL
Prices Based on Retail Costs and Town Union Labor

PREFAB. STEEL		CONVENTIONAL WOOD	
Cost of material	$1,099.01	Cost of material	$1,311.00
Labor for grading	151.20	Labor for grading	151.20
Concrete foundation	309.24	Concrete foundation	309.24
Concrete floor	424.82	Concrete floor	424.82
Erection cost	300.15	Erection cost	479.50
Erection time	268 man hrs.	Erection time	485 man hrs.
Cost of gutter	6.75	Cost of gutter	6.75
Cost of drain tile	13.18	Cost of drain tile	13.18
4 thumb latches	3.36	4 thumb latches	3.36
Power and plugs	22.04	Power and plugs	22.04
Cost of paint	10.25	Cost of paint	26.25
Cost of insurance	4.03	Cost of insurance	7.75
Cost of upkeep per year	10.00	Cost of upkeep per year	40.00
Total	$2,354.38	Total	$2,795.09

A pre-fab building somewhat similar to above size is sold by Butler, Martin, Steelcraft, and Stran-Steel with prices and sizes varying with the individual company. The figures were compiled "on the job" at Farm Quarterly's experimental farm, by Steelcraft.

The practical farmer, if constructing a wood building, will cut a tree or two for his uprights, and trade off labor for erection. Therefore, "wood" figures should be compensated by readers on the basis of how cheaply they can secure labor, and what little out-of-pocket money they would spend for material.

A big factor in favor of buying the pre-fab is the simplicity of it. The manufacturer supplies ready-made blueprints, a variety of designs, all the material, and a crew to erect the building. In days of critical labor and material shortage, each method of getting results is worth looking in to. Although the metal pre-fab takes 40 to 45 per cent fewer man-hours to erect, the specialized metal worker gets more per hour; and if the manufacturer or his dealer does it for you they add their profit to the labor bill.

keep the building at a dry, comfortable temperature, and counteract the heating up of the air inside the building caused by the animal's own body heat, and the carrying off of the vapor they add to the air.

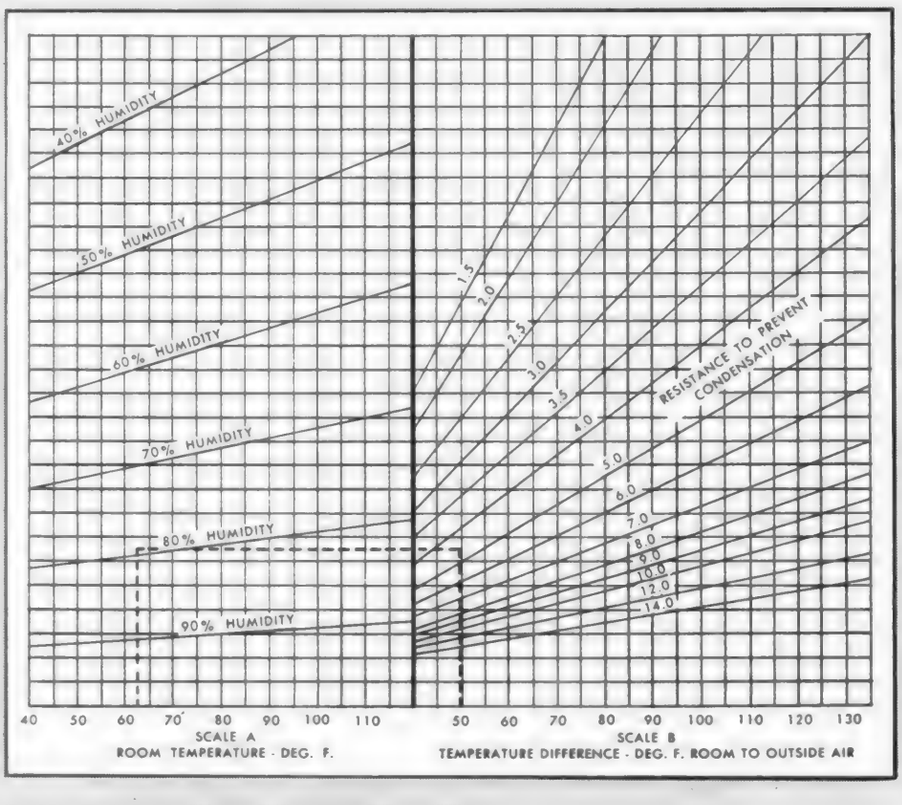
When animals are housed in metal farm buildings, the simplest method of reducing condensation (louvres for ventilation plus outside paint) is not enough because the animal itself is a source of heating up the air inside the building. The following scale tells how to determine the heat production caused by animals.

Animal	Approximate Body Weight	Heat Production (Btu per hr.)
Jersey cow producing 30 lbs. of milk per day	900	Average, 2800 at 50°F
Light work horse	1000	1790
Heavy work horse	1500	2450
Laying hen—average production	4	35.7 at 35°F
Hogs—pens holding 1 400-lb. sow and 8 pigs 1 week old	450	1130 at 35°F

That Man Said "Whoa!"

As with many other things, there are two schools of thought about the subject of keeping steers and even dairy cattle in insulated buildings, as compared to the economy and efficiency of keeping them in

BY A STANDARD point system, all insulating materials are assigned a resistance value. The higher the resistance value the more the material resists the passage of heat. Typical resistance value of well known materials: one inch thick wood 1.25; one inch corkboard 3.33; ⅜ thick plasterboard, 0.27.



How much insulation does a building need?

Like all graphs, this one looks like the prank of a mad scientist. But give it three minutes, and the secret's yours.

When you know a building's inside temperature, and inside humidity, and also the outside temperature, you can estimate how much insulation you require to prevent condensation. Where the dotted lines cross, to the right of the heavy black line, you require 4½ points of resistance to prevent condensation. All building materials: wood, cement, plaster board, insulation board, aluminum foil, rock wool, etc., each have a fixed value in resistance points. You simply add on resistance points until the value equals (in this case) 4½ and apply this to the building and there is no condensation. Three minutes up. Got it?

CHANCES ARE you've eaten something off this farm for it's owned by Curtis Candy Company. Not a stick of wood is showing; it's metal on concrete blocks as far as the eye can see. This is the nation's largest pre-fab operation and the owners and farm manager are satisfied. The conical tops and spires of the silos and grain storage tanks, and the low sweeping arcs of the barns enhance the "metallic feel" of this barn yard at Dundee, Illinois.

semi-open buildings which, of course, makes insulation needless because of the passage of air. At Wisconsin and Minnesota experiments are now being conducted on the fat added by steers and the milk given by cows when kept under well ventilated semi-open buildings as compared to the gain of fat and milk made under dry, comfortable shelter. The work in this connection is now in progress and additional herds are being tested before wide-spread publication of results.

Cows kept in a well ventilated, partly open loafing barn, with a foot of fresh manure and bedding underfoot have done better in freezing weather than cows kept on well cleaned cement stanchions in poorly insulated shut-tight milking rooms. One of the Wisconsin agriculture college men dryly reports: "When the water pipes freeze up, and your hands are pipe stiff with cold give me an insulated barn to work in."

A Slide Rule Does it

When a building engineer knows the area inside the building, the maximum number and kind of animals to be housed in it, the lowest outside temperature you wish to provide against, he can compute exactly how much insulation is necessary to prevent sweating and frosting. This computation is based on formula and is reasonably exact. First, the engineer writes down the lowest temperature you wish to provide against—in the case of this chart it is 50°. (Farm use, of course, would demand far lower.)

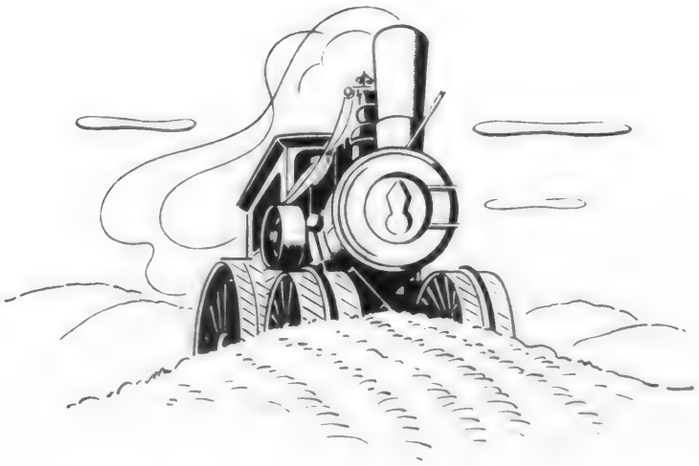
Second, he reckons with these figures:

1. The area of your building.
2. Size and number of animals.
3. Probable inside temperature when the outside is 50°. (In above chart the inside temperature was 62°.)
4. Probably humidity under these circumstances. In this case it was 80°.

Then he draws dotted lines as shown. Where the dotted lines on the right of the chart intersect, the engineer notes a figure—in this case 4.5.

That means he must provide for insulation material which, by standards employed in the building industry, equal 4.5 degrees of resistance. For instance, a piece

(Continued to page 129)



THERE WERE GIANTS IN THOSE DAYS

by ARCHER P. WHALLON

THERE were giants in those days, roaring over the land. The tractor was young and people weren't sure whether it was going to be merely another kind of traction engine or an entirely new creation. Those were the days of World War I, of gallant, optimistic adventure — "the world was being made safe for democracy." Then too, the farmer was being urged to "plow up more land to answer the world's insistent demand for more food," and the slogan "Food will win the War," flourished at every masthead. The possibility of crop surplus, depression and unemployment, the "New Deal" and W.P.A., and a greater World War II with its O.P.A., had not troubled the dreams of men. The combine was just beginning to come out of the west. The few "horseless farms" were curiosities and doubtful experiments, and agricultural leaders were verbose about the "rural depopulation peril and the problem of keeping the boy on the farm."

Back there a quarter century, when the agricultural prophets said "power farming" was the solution, they were right about it—but too often in the wrong way. Their courage and flights of fancy often outran their common sense. They confused size with strength, and the tractor giants of old, impressive in their bulk, carried far too much avoirdupois for their power, and were too elephantine for agility. Speed and ease of handling were chapters in a dream book.

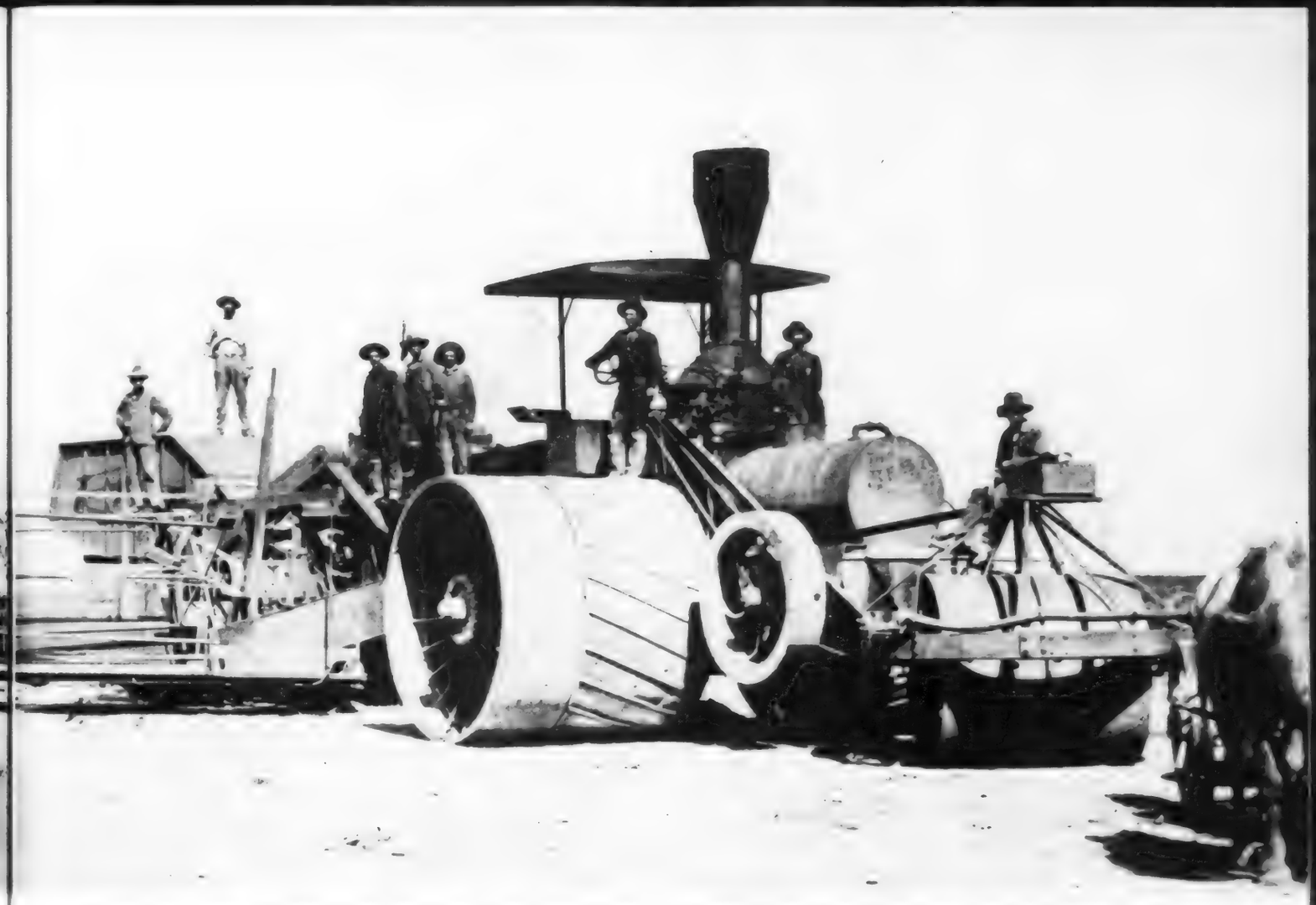
At the Winnipeg plowing contest of 1908 the average weight of the contending tractors was 537 pounds per rated belt horse power, and in 1910 it was 504. Compared to modern tractors weighing around 200 pounds per rated belt horse power, those early fellows carried enormous loads of useless metal.

Grandpa Thought of It

It was a long, long time ago that the germ of the tractor idea incubated in human imagination. Way back in 1618 (in Europe, the Thirty Years War was just beginning: two years before the Mayflower sailed for New England; nearly a century before the Frenchmen, Savery and Denis Papin, invented steam engines, 1698 and 1707; over a century before Watt's invention, 1765; and two centuries before Trevithick's locomotive, 1804) one David Ramsay patented in England "a system for replacing the labor of horses and oxen by inanimate motors for plowing the soil." In 1767 Francis More patented his "fire pump," as the steam engine was then called, to supplant horses, not only in working in the fields, but in the traction of vehicles. But they were but the visions of geniuses born centuries too soon.

Not until after 1830 did the mechanical tillage of the soil approach practical realization. This was largely due to the invention of the tubular steam boiler by the Frenchman, Marc Seguin, in 1827. In London in 1833 there was organized a "society for the encouragement of the popular application of steam power to transports in general and especially to the needs of agriculture." This was the beginning of the age of steam carriages, crude amalgams of stage coaches and traction engines, early ancestors of the automobile that went chugging and lumbering over the roads of early Victorian England, frightening horses and little children.

Those were days of awakening inventive genius—the sewing machine, telegraph, the reaper, all were coming on the scene and the idea of automotive farm power struggled bravely under the heavy burden of the crude steam boiler. In many particulars these old steam plows and tillers were strangely "modern," with features analogous with machines to appear the better part of a century later. The early spiral rotary plow, and the tilling member



STEAM BEHEMOTHS, belching fire and smoke and shaking the countryside as they crawled over the prairies, replaced horse flesh in western wheat fields when harvesting machinery combined the functions of the reaper, the binder and the thresher. These were the giants. Some had a wheel spread of thirty feet. Smaller outfits, tractor drawn, now do the same job faster with fewer men.

of the British Rickett rotary plow of 1859, are very similar to the French Maillet tiller of 1914, the Bagan rotary plow developed in western Canada in 1932, and the new rototiller.

Cable Systems

Plainly the irredeemable fault of all those early steam powered machines, even as of those of a later date, was their enormous weight. Successful farm power had to await the evolution of a lighter and more agile motor. For a half century, particularly in Britain, inventive genius sought to side-step the problem of great weight in another way—by the cable plowing and tillage system. The Fowler cable haulage plowing system was first exhibited at Lincoln, England, in 1854. In this system a gang plow with both right and left hand bottoms was pulled shuttle-wise across the field between two engines at opposite sides of the field. This was sometimes modified to require but one engine with an anchor at the opposite headland, a type more frequently used in France and Italy. In the "Howard" or "round-about" system a single engine fitted with a winding drum was stationed outside the field and the cable was worked over pulleys at the corners of the land to be plowed.

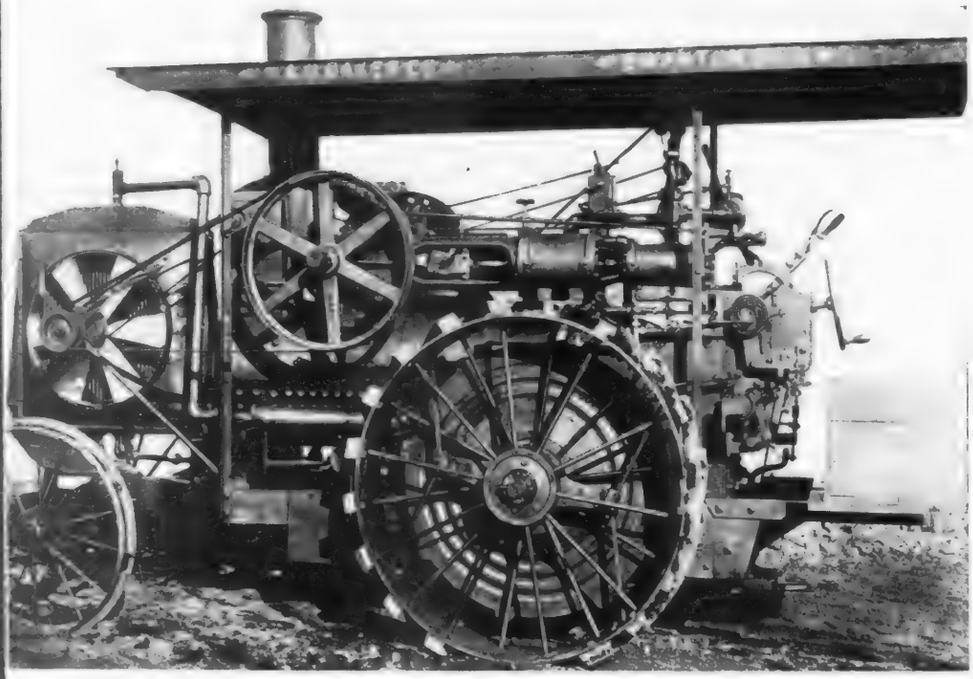
The cable systems got away from the problem of the excessive weight and the power loss of locomotion of the steam engine, but they brought no great saving in man labor, and their first cost was prohibitive for anything but large scale operations under favorable conditions. Nevertheless, they had a moderate success, particularly in England and Germany, where there were several hundred outfits in use. A few modernized versions are in use today. There have been some curious and fearful modifications of the idea. At Toulouse, France, in 1926, an electric powered cable tillage system was tried out and there were others using horse powered winding drums like a house-mover's capstan. The original makers of the British cable plowing systems are still in business, but their main product is a track-layer Diesel tractor.

Wanted, Gas Engines

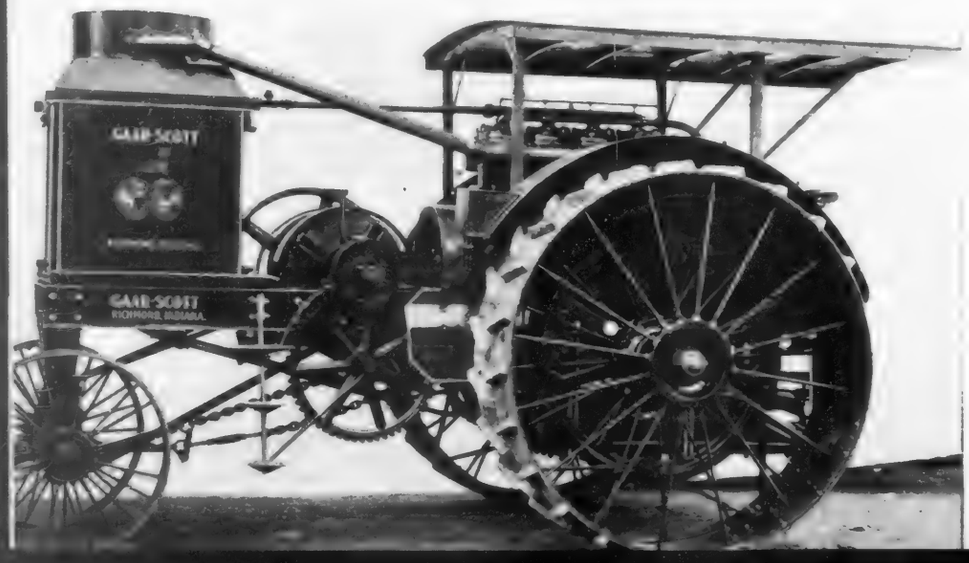
Though the steam and electric powered cable system was a giant, it was an earth-bound giant, and the extensive use of automotive power in agriculture still had to await the development of the lighter and more adaptable gas engine. The manufacturers knew that something had to turn up to make farm tractors practical. It was the gas engine, but when it first appeared they didn't recognize it as their savior. Early gasoline tractors merited about all the ridicule which the steam engine makers and threshermen heaped on them. The cannonading of their big cylinders shook the earth and wakened babies in their cribs miles away. There was a whirring of big flywheels and grinding of gears as the clumsy giants thundered along at a turtle's pace. Rated at a road speed of about two and a half miles an hour, possibly correct on a down grade, a bump in the road might stall them cold. And instead of a streamlined radiator, on their front was a contraption that looked like the result of a love affair between a shower bath and peanut roaster.

But their development, if slow to start, soon became rapid. During the summer of 1892, in the shade of a village store in Iowa, John Froelich built the first gasoline tractor that propelled itself either forward or backward. The J. I. Case Threshing Machine Co. made an experimental gas tractor in 1892, but the first commercial manufacture of a gas engine tractor is believed to be the one made by C. W. Hart in 1896, the Hart-Parr, now incorporated in the Oliver line. But it was not until 1903 that the tractor began to be a real commercial success. In 1916

FOR ALMOST A CENTURY after the first use of steam power on the farm there was little mechanical improvement. This cumbersome coal burner type was used mostly to power grain separators and was rarely used in the fields. It immediately preceded the first gas tractors. Some are in use today as "threshing engines."



STEAM ENGINE MAKERS bestirred themselves to improve their machines when the first gas tractors appeared. The result was improved types with condensers, automatic stokers, and tube boilers. This Baker appeared in 1927, but too late to save steam.



THIS GAS TRACTOR is typical of the first ones at their best—slow, heavy giants. Designers were "steam minded" and their first efforts resembled made-over steam engines

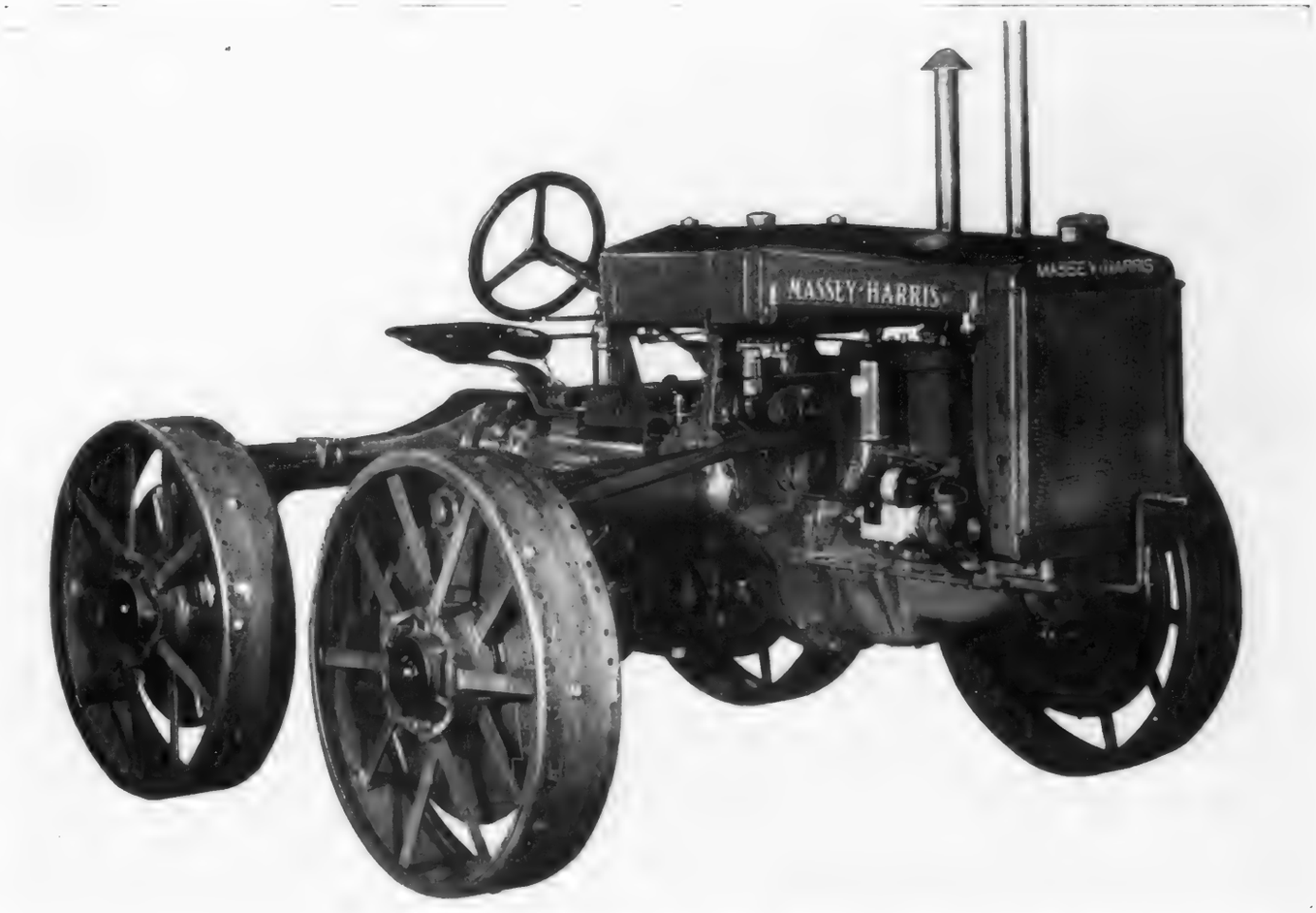
"The Farm Implement Review" listed 96 active makers with 137 designs. In 1918 a trade directory, "The Tractor and Implement Blue Book," listed 130 makes of tractors exclusive of garden tractors and cultivators. This figure included only those having considerable commercial production and sold by dealers. The number of adventures in the tractor field at the crest of the "power farming" spree was far larger. One authority, Harry G. Davis, of the Farm Equipment Institute, writing in "The Implement Record," claims a list of 593 establishments in the United States that attempted to manufacture farm tractors. There was an additional list of 169 British, French, German, Italian, and other foreign machines. A French work of 1920, Poncin's "La Motoculture Pratique," describes 116 makes.

Many of these ventures were little more than get-rich-quick schemes of selling stock in nebulous companies, as the one whose unworthy product had to be towed from the rented shop where it was assembled, to be photgraphed posed before a plow it had never pulled. But the sorry thing was that so many of these premature mechanical mushrooms, fated soon to perish in the hard soil of practical farmer trial, were honest and worthy products, the conceptions of courage, optimism and considerable mechanical genius.

Like Father, Like Son

Of the two main influences of tractor design, the automobile and the traction engine, it is obvious that the former is now four-fifths predominant, but it was the latter that had the most influence on the early designs. Because the first ventures into the tractor field were made by the manufacturers of steam-traction engines, their first efforts all looked like a steam engine had sired them. The engineers who designed them were not lacking in vision, for they quickly saw the writing on the wall, but they could not get the traction engine idea out of their minds. To many, the idea that a tractor should weigh less than ten tons was almost heresy.

It was these men, trained in the traction engine tradition, who brought out the big ones—the giants of those days. In 1918 the heaviest tractor listed in the "Blue Book" was a 35-70 h.p. job weighing 30,000 pounds. The most powerful was a 60-90 h.p. outfit which was, oddly enough, a ton lighter. But these giants with their six and seven foot drive wheels, with three to six foot rims, were dwarfed by the mastodonic steam engines they were about to supercede. They looked like toys beside the three-wheeled steamers of California

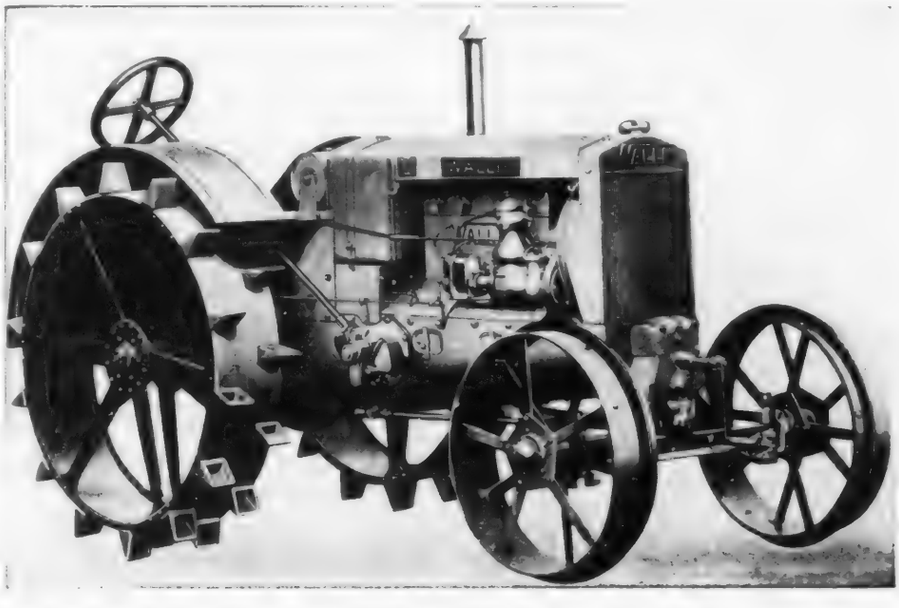


TO GAIN MOBILITY AND SPEED, makers broke away from steam design and came up with this transition type. The four-wheel drive was basically sound, but the tractor was heavy and complicated, and too costly for the depression years when it came out.

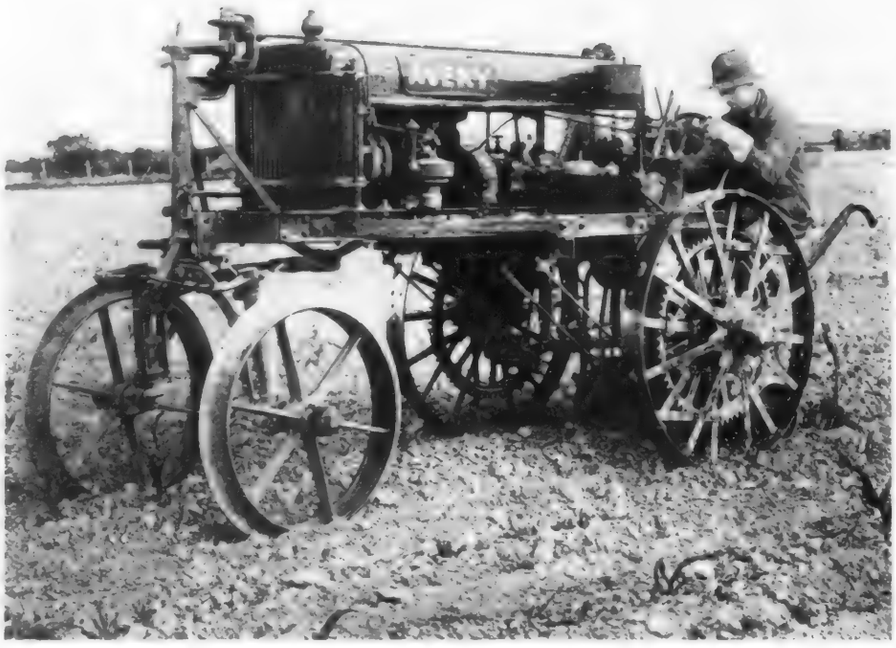
that sometimes had a tread or over-all width of over thirty feet. Possibly the nearest approach to this in the gas tractor line was a 200 h.p. machine brought out by one west coast maker.

Though many made money for their owners, all were heavy on the farmer's land and on his pocketbook, which they flattened out under prices of $3,000 to $7,500 or more. And some flattened their makers, for those were the days of incautious optimism, riotous showmanship, and profitless exhibitions. Everyone wanted to see who could make the biggest mousetrap as well as the biggest tractor. If one manufacturer assembled an outfit of a fifty-five bottom gang plow pulled by three of his tractors, his championship was short, for soon another had a sixty plow assembly "turning over an acre every three minutes," as the enthusiastic salesman put it, conveniently forgetting a few seconds of the actual time.

But the giants were not race horses—if their makers were intoxicated with visions of size and power, they scarcely thought of speed. In 1918 six miles an hour was the highest rated speed of any American tractor—far indeed from the 1946 dare-devil record of over sixty-five. The idea of pneumatic or even hard rubber tires for tractors or farm implements would have been laughed at here in America, but rubber "tyres" were being placed on steam



THE WALLIS, a modern and advanced design for its day, was made by J. I. Case when that concern was taken over by Massey-Harris. It was slow, it was heavy, but it had the lines and needed only the coming of rubber tires and a few refinements.



THIS WAS AVERY'S answer to the demand for a light tractor for cultivation. The cultivator was guided by the feet but the old plow handles were an anachronism retained to lift the plow when not in use. Note the power take-off and cog drive.

THEN CAME RUBBER, refinements in steering and mobility, speed, and hydraulically operated attachments. Modern demands must meet two types of uses: the heavy duty tractor such as this, and the light tractor for small farms and truck gardens.

wagons and tractors in England. One American company in 1913 and 1914 startled the market by advertising a farm motor truck fitted with wooden peg tires!

Design Runs Amock

If the pioneer tractor prospect was awed by magnitude, he was also bewildered by diversity. Traction, then the big problem in the tractor designer's mind, was multiplied in amazing ways. Drive wheels, one, two or four, were placed anywhere the maker thought they looked good. Some had large diameter drive wheels running in the furrow, and some single, wide drive drums or rollers. One of the latter, the Knapp "farm locomotive," a New York state invention of 1912, was in some respects of advanced design, with a "modern" front hood and a radiator like an automobile. Some makers furnished interchangeable round wheels and track-layers, and a French machine carried, in addition to its ordinary drive wheels, auxiliary track-layers to be let down and used in hard pulling. Two experimental tractors dispensed with wheels entirely: one was a huge mechanical screw which wiggled over the ground, and the other a walking robot with disc-shod reciprocating legs that marched clattering over the field. Innovation kept pace with the assembly of each machine and rarely did two tractors from the same maker have more than a family resemblance. A manufacturer could safely call his competitor's latest model a freak. Versatility and turning radius were great talking points, and soon there were short-turn and square-turn models that could make a turn in 30 feet.

The cable system tried a come-back about this time. The British substituted gas or oil engines for steam power on their old rigs, but in France there were more ingenious developments. The "tracteur-toueur automobile Filtz" instead of getting traction through drive wheels running on the ground, pulled itself along by gripping a cable stretched across the field. The more simple and practical "tracteur-truil," of which there were several makes, was designed to combine the advantages of direct traction and cable haulage. This was a tractor with an attached anchor or blocking device and a cable-winding drum at the rear. With this gadget all the power of the tractor's engine available at a power take-off could be used in hard plowing or other heavy pulling. This idea is in use now in California, where a track-layer, fitted with a winding drum or a winch and cable, pulls large "gopher" (the English say "mole") drainage plows and subsoilers, giant mechanical earthworms which burrow four feet underground.

Steam's Last Stand

About 1920 steam made its last stand. Possibly the last important improvement of the conventional steam traction engine was the Baker steam tractor. This had an automatic magazine self-feed coal stoker and a steam condenser, innovations which cut the water boy out of the threshing

crew. It was an excellent machine but it came too late, and its high price limited its sales possibilities. The same was true of the Bryan light weight steam tractor, an oil burner, built somewhat on the plan of the extinct steam automobile. There were also several modernized steam tractors of British manufacture, including a tracklayer, the Sentinel "roadless." There are those today who still dream of the revival of steam as an automotive power. With the development of the small, efficient, high pressure turbines this may be the step needed to further simplify tractor design.

Though it persisted far longer than might have been expected, it was soon evident that the large single cylinder gas engine was unsuitable for tractor service, but anything and everything else was tried. Two large makes of tractors had three cylinder motors, and in 1918, one maker, strangely adventuresome and modern, brought out an eight cylinder model called the "Common Sense"—but it had but a single big drive wheel. High compression engines were not yet perfected. Butane was unknown, but the Germans were pioneering with heavy oil and Diesel tractors over fifteen years ago.

Wood Burners

Charcoal gas tractors, pioneered mainly in France, were then, as today, interesting but impractical and inefficient. These machines substituted a stove-like gas producer for the conventional fuel tank, which developed an explosive gas from charcoal or wood. The idea was attractive because the farmer could make his home-grown, winter-cut woodpile furnish his next season's tractor fuel at little cost. In practice, the "gaz pauvre de bois," as the French called it, was literally too accurate a name, for charcoal proved to be a poor substitute for gasoline, without economy except in countries where oil fuels are very high priced or scarce. Contrivances burning charcoal were used in France, Germany, Italy and Japan throughout World War II. Attachments to convert gasoline motors to charcoal burners are still common sights on the roads of Europe. In spite of their theoretical values it is doubtful if wood gas has practical advantages for the American farmer.

By 1924 the tractor mills began to settle down; the cranks and the dreamers had been pretty well weeded out. Only about sixty makes remained, and of these about a fifth, together with a few new ones, are with us today. Such names as Big Four, Flour City, Oil Pull, Hart-Parr, Aultman-Taylor, Buffalo-Pitts, La Crosse, Hackney, Lambert, Pioneer, Mogul, Bull, Happy Farmer, Gray, Best—and many

(Continued on page 108)

FOR MOVING EARTH, multiple attachments, and heavy harvesting and ground working machinery, the powerful tracklayer gives more productive capacity to the single laborer.

THE MODERN TREND in heavy harvesting machinery is toward the self-propelled type. This Case combine is typical and does everything but take the grain to market.

THE "ONE-TEAM" TRACTOR for use on small farms and truck gardens. The peewees of the small jobs are two-wheeled walking tractors with handy attachments.

Fruit on the Bough

BY FRANK H. BEACH

PART ONE: PLANTING

The First in a Series of Articles for Farm Fruit Growers

THE FARMER who doesn't get the urge to sit right down and order the "Family Orchard Assortment" when the fruit tree catalogs start turning up in the mail box each spring might just as well hang up his pitchfork and order his farm auction handbills. He's through!

The catalogs paint a glowing picture of big money and "easy-to-raise" Delicious and Northern Spy apples, Hale and Cling peaches, Damson and Bradshaw plums; but the skeptic who lives down the road says, "It's too much trouble to grow fruit around here, bugs and blight ruin everything." Somewhere, in between, is the average farmer's fruit expectancy from good stock, which has been planted right.

For about $25.00 a planting can be made which will supply the average farm family with eating and canning fruit and, in good years take care of a cousin in town. Owen Phillips of Sewicky, Penn. bought the assortment listed here. The peat moss and fertilizer were added to do the job right. He has a garden pressure sprayer which will take care of the spraying while the trees are small. The pruning shears he'll need are in the barn, only slightly rusty.

The best time to plant fruit trees is in the early spring. If winters in your part of the country are not severe you can set them out in the fall, as a second choice.

You can never make a good fruit tree from dried-out and roughly handled stock, so take the time to find a reliable nursery which can supply you with trees to fit the following specifications.

Trees should be: (1) True to name variety; (2) Free from insect and disease damage; (3) Well grown, preferably 2 year old stock (except peaches which should be 1 year old); (4) Carefully handled and stored so as not to dry out. Packed for shipping with ample moist moss or shavings, wrapped full length, to protect the tops of the trees.

The county agent, a local fruit grower, or a neighbor who has bought trees recently, can help you select a nursery that ships good stock.

Your state university can supply a list of fruit varieties that do well in your part of the state. For home fruit orchards the dwarf apple and pear trees are ideal; they bear in a year or two after planting and can be sprayed or dusted with inexpensive equipment. Standard apple and pear trees have the disadvantage of not bearing until they are 6 to 15 years of age, and they require power equipment to spray or dust them properly. However, they make shade while they are developing, and when they do come to a bearing age the yield is much greater.

A BALANCED FARM FRUIT PLANTING

	Approx. Dist. Between Trees, Ft.	Time, from Planting to Fruiting, Yrs.	Approx. Annual Yield
APPLES			
1—Dwarf Delicious	10	2-3	¼-½ bu.
1—Dwarf McIntosh	10	2-3	¼-½ bu.
1—Dwarf Yellow Transparent	10	2-3	¼-½ bu.
1—Cortland, standard	40	6-10	5-10 bu.
1—Red Spy, standard	40	10-15	5-10 bu.
1—Stayman Winesap, standard	40	8-10	5-10 bu.
PEARS			
1—Dwarf Bartlett	10	3-4	¼-½ bu.
1—Dwarf Duchess	10	3-4	¼-½ bu.
1—Dwarf Seckel	10	3-4	¼-½ bu.
PLUMS			
1—Stanley Prune	22	5-8	1-2 bu.
1—Green Gage	22	5-8	1-2 bu.
1—Bradshaw	22	5-8	1-2 bu.
PEACHES			
1—J. H. Hale	22	3-4	1-2 bu.
1—Hale Haven	22	3-4	1-2 bu.
1—Golden Jubilee	22	3-4	1-2 bu.
CHERRIES			
3—Montmorency	22	4-6	1-2 bu.
1—Windsor	30	6-8	1-2 bu.
1—Schmidt	30	6-8	1-2 bu.
1—Bing	30	6-8	1-2 bu.

Total cost of trees	$22.20
Bale of Peat Moss	3.50
Bag of Fertilizer (0-14-7)	1.80
Total	$27.50

FISH OUT OF WATER have nothing on fruit trees that have their roots exposed to spring wind and sun. "When in doubt—heel in", is the advice of experienced tree men. If trees can't be planted for a couple of days because of weather conditions, or other work, or if the planting isn't completed the first day, the trees should be heeled in, on a well-drained spot. Make the trench deep enough to take the roots comfortably; then space the trees along it with their tops pointing to the southwest. Cover the roots with fine soil and tamp lightly with the back of the shovel to avoid air pockets. Finish off with 6 inches of soil over roots and around trunk; the trees will stay in good condition for about a month.

WELL-PACKED TREES have the roots covered with damp moss or straw in a burlap wrapping. The tops are protected by paper and are firmly tied. The trees should be kept in a cool place until you are ready to plant them. Save the moss for mulching after planting tree.

SORT THE TREES according to the variety indicated on the label. From an inspection of the roots estimate the size of the hole which must be dug to allow them to be spread out in a natural position. Keep the roots well moistened and in the shade while digging the hole.

THE TOP SOIL, about the first 8 inches, is placed in one pile, and the sub-soil is placed in another. The hole should be deep enough to allow placement at the same depth that the tree grew in the nursery, which shows as a "fade line", or change of color on the tree trunk.

DO A DOG WALK around the trunk of the tree to tamp the top soil mixture firmly into place around the roots. The subsoil is now placed in the top part of the hole to fill it to the ground line. It is a good idea to leave a slight dish effect to collect water from the spring rains. In filling lean the tree slightly toward prevailing wind; this makes it grow straight.

AFTER PLANTING, the top of the tree is pruned to restore a near balance between the top and root area. Sharp angle crotches are eliminated and the branches are spaced equally up and down and around the trunk. Where there is a whorl, such as is shown here, two branches are removed, to make a single dominant leader, which becomes the new trunk.

MIX A BUCKET of wet peat moss, for tilth, and a couple of handfuls of superphosphate, or 0-14-7, for food, with the top soil and place it firmly around the roots. Fresh manure should never be placed near tree roots; straw in the hole leaves air space and roots dry out.

DO AS LITTLE root pruning as possible at planting. Remove any damaged roots or ragged ends. The largest possible absorbing area is needed to get the water and nutrients into the tree so that it will get off to a good start. Damaged root is being trimmed correctly.

DON'T DROWN THE TREE in the hole. Standard varieties go only as deep as the nursery depth. IMPORTANT! With dwarf trees the ground line should be well above the graft as shown in the picture above. If tree above graft takes root it will lose dwarf character.

DWARF TREES must be braced because of small root area. Put screw eyes in the tree and connect to a stake with stiff wire. Cut at (A) shows removal of whorl; branch was removed at (B) because it was too close and directly above another; (C) shows a snug clean cut, which will heal rapidly. Remove name tag to keep wire from girdling the growing tree.

HARDWARE CLOTH rodent guard and straw mulch should be placed around all trees. A circle of cinders or slag about 1 foot in diameter around the trunk further discourages rodents. If the weather is dry the tree must be given a bucket of water; and it's a good idea at any time. It helps settle the ground and give the tree a good start, even in a dry spring.

BEFORE PRUNING. A peach tree that has a well grown branch system at one year of age. The shears are placed at the correct point for the cut, about knee high. This will develop a low, open-headed tree. Experienced tree men like the three-branched peach tree, as it is easy to space the secondary branches that come later. The diagonal cut sheds rain.

AFTER PRUNING. It takes a brave man to prune a peach tree properly. Such drastic pruning is needed to develop an open-center tree. This is desirable on peaches because the fruit is grown only on the previous year's wood. On the open-center tree the young wood grows over a long length of limb, and the fruit is sprayed, thinned and picked easily.

BEFORE PRUNING. This standard apple tree was placed so the lowest desirable limb, which is to be retained, is on the southwest side. This limb is about knee-high, and it will provide shade for the trunk of the tree and prevent injury from sun scald. There is a "sling-shot" crotch at the top of the tree that will be eliminated, to prevent it from splitting.

AFTER PRUNING. The bad crotch has been removed at (A). The trunk which continues is being shortened by about ⅓, and the lateral branches have been shortened about ½. This will put the top and root system in balance. The remaining branches are well spaced and they make wide angles with the trunk which will develop strong crotches.

BEFORE PRUNING. A Montmorency, or sour cherry, is trained by thinning out. The top of the tree is kept open for spraying. It is especially important that no branches be allowed to grow opposite or above each other or growth may be choked. There should be no shortening of the branches that are to be left on the tree or they will be badly stunted.

AFTER PRUNING. The Montmorency cherry tree has had all branches removed except four good laterals. A lateral is any branch that comes off the main trunk. The branches that remain all make wide angles with the main trunk. This is the ideal condition, for a narrow angle branch is apt to split when the tree is bearing a heavy crop and is hit by strong winds.

BEFORE PRUNING. A two year old well branched sweet cherry which will be pruned as indicated by the branches that are being held. This cutting will prevent a crowded head and develop desirable spacing of wide angle lateral branches. The cherry tree is thinned out, in contrast to the apple which is cut back. Both methods balance top and root area.

AFTER PRUNING. This sweet cherry has the first branch at the proper height above the ground. It will be easy to work around it later on. This distance does not change as the tree grows. All cuts on fruit trees should be painted with the antiseptic pruning paint that will keep bugs and moisture out. It can be obtained at most hardware and farm supply stores.

MRS. HARRY WEBER, Miamitown, Ohio, raised Dorsets and Southdowns before she changed to Karakuls. Thirty-five of her first pelts went into a custom made coat for herself. She shears her flock twice a year and gets a good price for the wool.

Karakul

By GEORGE E. JONES

THE United States imports approximately four million Karakul sheep lambskins annually. The annual production in this country does not exceed 8,000 skins. This indicates a potential market of many millions of dollars for Karakul sheep pelts here in America and a wide open opportunity for the farmer who has range he can use for sheep and the specialized ability to produce and market Persian lambskin fur.

Eight years ago, Harold Hemingway, a tire salesman, quit his job and went back to the farm, a 12 acre tract in Southern California. He purchased 5 registered Karakul ewes, paying $100 each for the animals.

Today, by smart promotional methods, Hemingway has developed one of the largest Karakul fur farms in America, and sells breeding stock, milk, cheese, and processes the wool into blankets and robes.

On the Harry Weber farm, Miamitown, Ohio, is a good example of what can be done with Karakuls as a specialty in connection with general farming. Mrs. Weber, who is herdswoman of the flock, says she has had nothing but pleasure from her ten years' experience with Karakuls.

"They are as tough as hickory knots," she says. "Three of my ewes were led astray by a new ram out of season and each dropped a lamb in the snow. Do you think those lambs died? They did not. When I got up in the morning I said to my husband, 'What are those black spots out there in the field in the snow? Go look.' So he went out and found the three lambs and hollered back, 'All alive and ready to run.'"

Mrs. Weber has a beautiful coat made from choice pelts from her flock. If a lamb hasn't a good pelt she lets him grow and eats him, or sends him to market.

Mrs. Weber raised Dorsets for many years before she took up the Karakuls and says the latter are less trouble and much more interesting. She believes Karakuls could be more profitable than ordinary wool-and-meat sheep, but she has made no attempt to commercialize her flock, preferring to handle it as a sideline to general farming.

Karakuls can be fed the ordinary grains and roughages generally grown on farms, and can be handled in the same manner as other breeds of sheep. They are subject to the same ailments, such as pneumonia, internal parasites and injury, but are as hardy as the hardiest of sheep. The breed is able to exist and do well under almost any conditions of sparse forage. The cost of maintenance is about the same as for common breeds of sheep raised in the same section of the country.

Since Karakuls have been raised for centuries under conditions of tropical temperatures and low rainfall, as well as in high, cold altitudes, all sections, except excessively humid regions, of the United States and Canada suited for sheep of the wool and mutton types are suited to Karakul raising. Flocks are now doing well in many states, Texas, California, Colorado, New York, Idaho, Wisconsin, Minnesota and Ohio. The breed is noted for its hardiness and is able to exist and do well under almost any conditions.

Only a fraction of the domestic market for Karakul lamb skins is supplied by American growers. Bottlenecks of high priced breeding stock and the low price on pelts must be removed to give the average farmer a chance to make money in the industry.

Sheep

The sale of wool, meat, breeding stock, milk and cheese are profitable sidelines to the main source of income, the sale of pelts.

Here in the United States we produce less than one per cent of our domestic consumption of Karakul lamb pelts, which includes broadtail, caracul, and Persian lamb furs, depending mainly on when the lambs are pelted. The United States fur trade can absorb the crop of a very much expanded Karakul sheep raising industry as fast as the breeders produce high quality pelts and do not pelt lambs that should be grown out for mutton. Low quality foreign pelts are not imported because they won't pay their own transportation.

Fur Preferred

The majority of imported lambskins come from Bokhara, Afghanistan, Southwest Africa, Bessarabia, Shiraz, Baghdad, Salzfelle, and India. The fur trade prefers pelts from Bokhara because they are heavily furred, with a well-developed curl, and possess a pleasing pattern all over the back and well down on the sides, including the legs and tail. The luster is brilliant.

THIS LOVELY COAT is made of silky, soft, lustrous, black Karakul in a fine, flat moire pattern. It is fashioned like fine fabric with billowy balloon sleeves, triple ripple back and cardigan neckline. It is a luxury fur item for dress and gala evenings. I. J. Fox of New York prices this coat at $588, plus tax. For a small woman, 20 skins will make a coat; for a large woman, 30 to 35. Colors range from black through brown and grey to white.

UNLESS it is to be saved for breeding purposes, the life of a Karakul lamb is short and simple. Quality of fur decreases by the hour after birth. There are few multiple births and there will be about 110 rams to 100 ewes. Throwouts are fattened for food.

Afghanistan pelts are similar to those from Bokhara, but some buyers say the pelts are not as well covered with uniform curls. Pelts from India, Southwest Africa, Bessarabia, and Rumania are also becoming popular with the trade.

Breeders in this country find it difficult consistently to produce lambskin fur sufficiently high in quality to meet the competition of the best foreign pelts, because, even from purebred Karakuls, the quality of lambskins is extremely variable. The only way to improve the quality of the fur is by selective breeding to purify Karakuls genetically for the uniform production of highly desirable fur.

The development of the Karakul sheep industry in this country will be accomplished, specifically, through rigid selection of stock based on detailed individual fur-production records. This will raise the fur-producing levels of Karakul stock, and make reliable breeding animals more generally available at reasonable prices. The fact that a ewe is purebred is not a guarantee that she will drop top quality lambs. Each ewe, and the rams which sire the lambs, should be selected on the basis of performance, and bred on performance. In this Karakuls are like all purebred stock. Let the buyer beware of stock of unknown or unproved performance.

Origin

The Karakul breed of sheep originated in Bokhara, in west-central Asia. The mountainous deserts, sparce feed supplies, long distances to water, and generally hard life long ago imparted to the breed a hardiness and ability to survive which is distinctive of Karakul sheep to this day.

Three importations of selected Karakul sheep totaling 34 rams and 33 ewes, were brought into the United States in 1909, 1913, and 1914, from Bokhara. These first Karakuls were introduced by Dr. C. C. Young, of Belen, Texas, during the last year Theodore Roosevelt was in the White House. President Roosevelt encouraged the importation.

Characteristics

Karakuls belong to the fat-tail breed of sheep, the tail being broad, flat, and tapering rapidly toward the end. The fat stored in the tail enables the sheep to withstand long periods of scant feed. The head is particularly characteristic of the breed, the face black and narrow, the skull much rounded, with Roman nose, and thin, black, pendulous ears. The legs, as well as the face and ears, are covered with short, fine, lustrous black hair. The ewes are generally hornless, but most rams have long, spiral, outspreading horns.

The wool of the adult is coarse and long and varies in color from black through various shades of brown to light gray and white. Practically all lambs are black at birth and continue that color until they are yearlings, after which the wool gradually becomes lighter. However, this change of color is not uniform in all animals, some remaining rather dark in maturity, whereas others become very light.

Occasionally a white lamb will be born. Mrs. Weber attempted to breed out a white strain from a white lamb after one of her ewes dropped this rarity. She thought she was nearing success when a careless hired man caused the death of the ewe. She also tried crossing Karakuls with Dorsets but the result was not interesting.

Starting

Karakul sheep raising is generally regarded as a specialized undertaking because the farmer going into the business should possess, in addition to the know-how about breeding, feeding and management of sheep, a knowledge of the preparation of pelts and the rather restricted conditions of the Karakul fur market.

The best way for a farmer to become familiar with the complexities of Karakul sheep fur and the methods of grading is to make a tour through a raw fur market.

A PART of the 6000 head of Karakuls on the 5000-acre Hemingway ranch, Ontario, Cal. If the industry can eliminate high-pressure and often unethical breeding stock promotion, commercial flocks such as this will be common in the west.

It is possible for one to visit raw fur establishments in Chicago and New York and familiarize himself with classification, grading, and market requirements of the pelts. In this way, the farmer will know which lambs in his own flock should be pelted, and the ones to keep for breeding purposes or for slaughter.

Cost

Prices of purebred Karakul sheep will range from $25 to $75 per head, with purebred rams selling around $100. If more than $50 is paid for purebred ewes or $100 for purebred rams there should be evidence that they are considerably above the average in production of high-quality fur. In fact, if high prices are paid for the sheep, the only means of obtaining a fair return on the investment would be through their use for the production of purebred registered breeding stock, to be sold in turn at high prices. It will take a high priced ewe a long time to pay out as a producer of lambs for pelts.

Animals from a long line of ancestry recorded for fur quality would be a reliable index as to what could be expected in the fur quality of their offspring, but a top ewe often throws a lamb poor in fur quality, and conversely, an ordinary ewe will sometimes produce a top quality lamb.

Selecting a Ram

From a practical standpoint, the best way to select a ram is to inspect his progeny at the ewe's side. In this way, the prospective buyer will be able to determine the type of fur-producer the ram is. The most satisfactory breeding stock will come from those flocks where the farmers have practiced rigid selective breeding with only purebred registered ewes mating with purebred registered rams.

Names of breeders having stock for sale may be obtained from L. K. Brown, who is Secretary of the Karakul Fur Sheep Registry, a national registry, Friendship. Wisconsin.

Housing

Karakul sheep are so well protected by nature that they do not require warm housing. Karakuls are more often harmed by too much housing than by too little. The essentials are a windbreak and a dry place to sleep. An open shed backed to the prevailing winds and storms makes an ideal shelter for the flock. So little expense is required for shelter that it is not a factor of importance.

Feeding

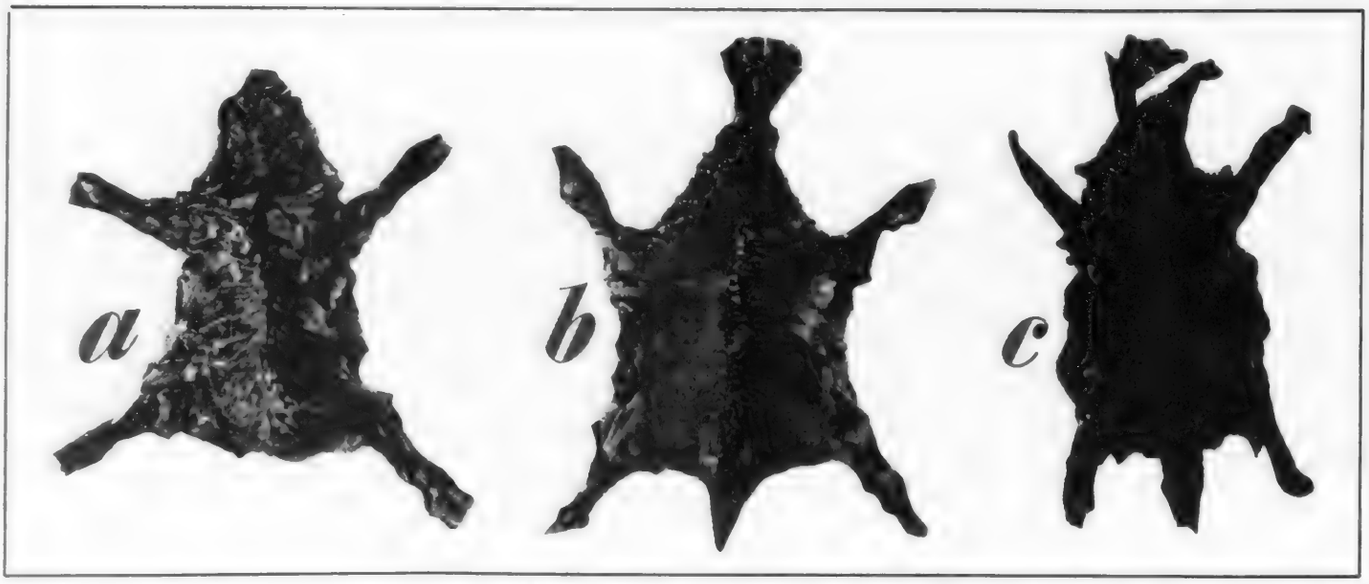
Pasture for Karakuls is a simple problem, as almost any sort of pasture will provide nourishment. The only precaution one needs to take is to avoid forcing them to eat poisonous weeds and plants, as they fall victim to poisonous plants the same as other sheep.

They thrive on brush and almost any kind of native grasses, such as Blue Grass and Bermuda. There is some danger, however, of bloating when sheep are grazed on alfalfa or clover, because of the dew. Sheep should be given a good feed before being turned on such pasture, and the alfalfa and clover should be dry. Karakuls prefer high, dry pastures.

On summer pasture Karakuls need no supplemental feed. In the winter they can continue on pasture, but should have a supplement of concentrate. If there is no pasture available a ration of four pounds of roughage per head per day should be fed in addition to the concentrate.

They will eat all types of feed such as alfalfa, oat hay, lima bean straw, or any other good rough feed except barley hay, which is not desirable because the sheep may get sores in their mouths from the barley beards. Bucks and pregnant ewes require very little extra feeding, but silage is excellent for suckling ewes, and until good pasture is abundant, lambs always should have a little extra grain, preferably in a lamb creep.

A commercial flock of ewes kept for producing pelts does not need to be fed so well nor kept in such high condition as purebred ewes kept for breeding. This is especially true of pregnant ewes because



KARAKUL LAMB SKINS are graded by the trade under three main types: (a) Broadtail (b) Persian Lamb (c) Caracul. A flat, pleasing pattern is much desired, and each grades into the other. Broadtail is the most sought after and highest priced.

heavy feeding tends to cause the lamb to be carried longer and to be born with the fur past prime. Also, the heavy feeding tends to produce a heavy leather in the pelt which is discriminated against in the market. A commercial flock of Karakuls can stand poor or sparse feed conditions as well as sheep of any breed and yet give a maximum return in pelts.

The feeding of mature rams is also a simple matter. In summer rams will do well on pasture alone, and if good legume hay is fed at other seasons only a small amount of grain need be added unless they are being used heavily for breeding. A mixture of three parts oats and one of bran, fed at the rate of one pound per day, is an excellent supplemental food for rams.

The ordinary feed troughs, silage bunks and hay racks, sufficient to allow enough room for all sheep to prevent crowding, is all that is required in the way of feeding equipment.

Troubles

Raising Karakuls is not all beer and skittles and troublesome conditions are to be expected. Constipation is indicated by straining and distress, and can be remedied by a teaspoonful of castor oil. Indigestion is shown by distress and frothing at the mouth. A liberal dose of castor oil will effect a cure in most cases.

White scours can best be cured by giving one-fourth of an ounce of baking soda, one ounce of sulphate of magnesia, and a pinch of ginger in a small quantity of flaxseed tea or gruel. This should be followed in about four hours with two ounces of linseed oil.

Sore eyes are of rather common occurrence in Karakuls. The eyes develop a milky scum and tears flow freely, and in bad cases, become an angry red. An eyewash of silver nitrate or 15 per cent argyrol will clear them up in a few applications. A very small drop of pure sheep dip is also recommended by some.

Scabs often appear around the lips. These should be rubbed off, and sheep dip or a medium-strength solution of copper sulphate applied. In the treatment of stomach worms, Phenothiazine, a coal tar derivative, is highly effective as an anthelmintic. It should be given as a drench in the spring and fall, and fed one part in ten with coarse salt the rest of the year.

Lambing

Flocks in this country breed from September to April. In good condition a ram can take care of a flock of 75 to 100 ewes, if the lambing season is distributed over a long period, or 40 or 50 ewes if the lambing season is to last only a month or six weeks. If hand breeding is practiced and the ram is kept separate from the ewes, allowing but one service to each ewe in heat, a good ram in prime condition can service a flock of 150 ewes. The ram should get plenty of exercise. A Karakul ram may be useful as a breeding animal to the age of eight years or more. It is wise to limit the average ram to 30 to 50 ewes per year.

Karakuls can be bred at a year to thirteen months of age. The normal gestation period ranges from 147 to 152 days. Ewes whose lambs have been pelted can be bred again within 30 days. Only about 5 per cent of the births yield twins. It is safest for the farmer to plan for one lamb per ewe per year. Under good farm management, the productive life of a Karakul is seven or eight years, or about two years longer than mutton sheep of the dark-faced breeds.

About four to six weeks before lambing, if their condition indicates that they need it, the ewes should be fed a half pound of concentrate daily. Like the rams, overly fat ewes are not the best breeders, and at both breeding time and lambing time the ewes should be in strong breeding condition. If overly fat they are more difficult to get with lamb, and do not lamb easily, although more fat can be tolerated at lambing time than at breeding time, as the suckling lamb quickly brings down the flesh of milking ewes.

At lambing time, the ewes should be placed in lambing pens, approximately three by six feet. In most cases the ewe will have no difficulty at the blessed event, nor will she need aid. However, if a ewe should be in labor longer than three hours without dropping her lamb, it is wise to call a veterinarian.

If by chance the ewe has lambed with the herd, pick up the lamb and carry it to the lambing pen; in most cases the ewe will follow her lamb into the enclosure. If she doesn't, catch her and put her in.

KARAKULS RETAIN the characteristics of their Bokhara desert ancestors—fleetness of foot, hardiness, and the ability to survive under adverse conditions.

She should be penned with the lamb until she definitely owns it.

Now is the time to make a decision about the disposal of the lamb. If it is a buck, and it has a good pelt, it should be pelted at once, or at least within twenty-four hours unless it is an extra good purebred that should be saved as a sire. If the ewe lambs are being reared as breeders, both the ewe and the lamb should be kept in the pen for four or five days and then both returned to the flock. If the lamb is pelted the ewe should be retained in the pen under observation for forty-eight hours until her milk supply is regulated. If she should come into her milk heavier than nature can regulate, milk her down half way a time or two, massaging her udder with her own warm milk, and then return her to the flock. If the lamb has not sucked, the ewe's udder seldom needs attention.

On rare occasions, a ewe will be a little nervous or reluctant in allowing her lamb to nurse. In such cases, step into the pen and hold the ewe, while the lamb nurses. A day or two of this treatment will generally persuade the ewe to be a good mother.

The ewe's udder should be closely watched to see that it is in good condition. Ewes that have lambed should be fed lightly at first, reaching a full feed about the third or fourth day. At this time it is best to feed heavily enough to produce a large flow of milk for the lambs. Heavy-milking ewes can make good use of from one to two pounds of grain a day.

Weaning

At a week or ten days of age, the lamb will start picking around for food other than milk. Most breeders provide lamb creeps where the lambs have free access to self-feeders or feed troughs out of reach of the other sheep. Rolled oats or lamb size sheep cubes of crushed oats or barley make good starting feeds. Many lambs, if

(Continued on page 111)

KARAKUL WOOL is lustrous but coarse and brings from one-half to three-fourths the price of wool from standard breeds. It goes into blankets, rugs, robes, and carpets.

THE KARAKUL RAM is not a beautiful animal. The Oriental cast to his head reflects his origins. If handled properly a young vigorous ram can serve a flock of 100 ewes.

IF WELL DRAINED this field could produce 75 bushels of corn per acre. Wet weather in May delayed planting and a shallow root system left the crop unable to withstand drought later in the season. Tile in this fertile field would pay for itself in a short time.

FARM DRAINAGE

By VIRGIL OVERHOLT

WHEN I was a boy my father bought the first manure spreader in our township. It was a high-wheeled, steel-tired, return-apron type. The top of the bed reached to my chin and I was not short for a thirteen-year-old. Father liked to haul manure direct from the stable and spread it from the wagon. Hauling manure seemed to be my special job. I guess I was a lazy cuss for the new Kemp spreader made me almost as happy as the red "safety" bicycle I got for Christmas.

Late one December afternoon I started to a field in the north forty with the usual load of manure. There were a few "wet spots" in this field. In crossing one of these the spreader wheels suddenly sank to their axles. The harder the team pulled, the deeper it sank. It was beginning to freeze. I was cold and muddy from head to foot. Finally, in disgust, I unhitched the team and drove to the barn. It was dark by this time. That night the thermometer dropped to three below. Since the spreader was built almost entirely of wood we could not thaw it loose by building a fire around it. That spreader was still there until the first spring thaw. In the meantime I had to spread the manure by hand.

I vowed then and there that I would never grumble when dad asked me to help dig tile ditches. We not only drained that "wet spot" but, with the advent of the traction ditcher, put many hundred rods of tile in other parts of the farm, all of which are still functioning.

But saving labor and wear and tear on farm machinery are not the only advantages of draining wet land. Tile drainage often means the difference between complete failure and bumper crops. Well drained soils warm up earlier in the spring because it requires much more of the sun's rays to warm water than soil. The season of crop growth and harvest is lengthened. Crops on well drained soils withstand drouth better. Young plants establish shallow root systems if planted in wet ground. When dry periods of late summer arrive the plants can't reach the moisture that is still found deep in the soil. A single wet area in a field may retard tillage, planting or harvesting operations in the entire field for several days. The wet spot will thus affect farming operations and yield on the whole field. It will pay to drain such areas even though the cost will exceed the value of the area reclaimed.

Tile drainage does not remove any moisture available for ordinary crop growth. It removes only the free-flowing gravitational water from the soil. The plants use only capillary moisture which is trapped between the finely-divided soil particles. Plant roots require air as well as water. There is little air in a saturated soil. Heaving of winter crops, such as wheat, alfalfa and clover, will seldom be serious in well drained land. Good drainage will increase the efficiency of lime and fertilizers and there will be less loss from leaching.

All soils do not require artificial drain-

DRAINAGE GRADES run "by guess and by gosh" are the worst sort of gamble. Your eye can fool you but it won't fool water, which won't run up hill. It pays to get the services of a drainage engineer or experienced contractor to plan the layout and run the levels. A surveyor's level won't guess at grades. Stakes should be set 100 feet apart and the levels, for the guidance of the ditcher, indicated by cross-strips nailed to the stakes.

THIS OPEN DRAINAGE DITCH has silted up through neglect. The slopes will be flattened so that they can be mowed, planted to Reeds Canary Grass to prevent erosion. Canary grass offers little resistance to flow, does not spread to adjacent fields.

A TRACTION DITCHER will dig at least 100 rods of ditch per day. By sighting over the level markers on the stakes the operator can cut to an accurate grade. The bottom of the trench is smoothly finished and ready to receive the tile.

age. Sandy soils may possess adequate drainage naturally. An abundance of organic matter will materially aid the drainage of any wet soil and retain more available moisture for plant growth. Plenty of organic matter in the soil will increase the efficiency of tile drains. Poor farming methods that rob the soil of its organic matter will destroy desirable physical properties of the soil and decrease the efficiency of tile drains. Farmers frequently say that their tile lines do not work as well as they used to, even though the tile are open and have good outlets. Too many clean cultivated crops, such as corn, and not enough sod crops or legumes are probably responsible for such conditions.

Some soils with level topography have good enough internal drainagle to handle the water that falls directly upon them, but they may stay too wet for cultivation longer than they should because of surface runoff from adjacent higher land. A diversion ditch or terrace around the base of the higher land will protect the flat land from the surplus runoff. It is like placing spouting on a barn roof to protect an open barnyard. Diversion terraces so located will either eliminate the necessity of tile drainage or increase the efficiency of the drains.

Some level land has a subsoil too tight and compact for the efficient use of tile drains. The natural productive capacity of such soils is seldom very high. To effectively drain such land, the tile lines will have to be placed so close together that the cost may exceed the value of the land. This is frequently true of such soils as the Clermont silt loam. The drainage of these soils can be greatly improved at little cost and a slight inconvenience by "bedding". Bedding consists in plowing the fields in "lands" with dead furrows not more than sixty feet apart. The dead furrows may be kept in the same location for two or more rotations. There will then be good surface drainage from the back furrow to the dead furrow. Surface outlets must be provided for the dead furrows. Special techniques have been developed for plowing and planting bedded land. Tile drains will still be profitable for local wet spots in bedded fields.

Planning the Drainage Layout

More than 10 per cent of all tile drainage now being installed is replacement of old "hit or miss" drainage improperly planned. An occasional tile line had been installed from time to time to drain the wettest spots. The owner later decided to drain the entire field or farm. He discovers that the tile lines already installed will not work into any complete plan. He will probably decide that it is cheaper to forget the old lines rather than try to build a system around them.

The first step for any farm is to develop a complete plan for the entire farm, or as much of it as may need drainage. To properly plan the drainage for a whole

farm the services of an agricultural engineer is needed. Your Extension Service or Soil Conservation Service, through your county agent, will supply the engineer. He will record your drainage plan on paper to a scale of one inch equals one hundred feet, or one inch equals two hundred feet. It will not be necessary to install all of it in any one season. Drain the wettest land first but be sure that any tile that are installed are a part of the complete plan. The average farmer who once starts to drain his land tends to raise his standards from year to year. He will later drain land that originally he did not think needed it.

Topography plays an important part in the design of a drainage system. Except in very level country no two farms will have the same topographical features. There are, however, a few important principles that should be observed in planning the layout. In general, the mains should be short and the laterals long. The mains are larger tile, the principle carry-off lines, into which the laterals empty. Short mains are less expensive than long ones. Short mains will result in long laterals. The only limit to the length of a lateral is its ability to carry the required amount of water. Referring to Table B it is seen that a four-inch tile line having a grade of two inches per one hundred feet will drain five acres. If the laterals are spaced four rods apart they would have to be two hundred rods long before they would each drain five acres. Many short laterals are more subject to trouble than fewer long ones.

Tile mains will serve as laterals to drain the soil for a width equal to the spacing of the laterals. Laterals passing through this soil to the main will also drain the same land. This land is then said to be double drained. Long mains result in more double drainage than short ones. Double drainage will not harm the soil but it does add unnecessarily to the cost of the system. Efficient drainage systems will have a minimum of double drainage.

The drainage system should have as few outlets into open ditches as possible. Good outlets are expensive to construct and are subject to neglect.

Laterals emptying directly into an open ditch along the side of a field require a large number of troublesome outlets. A better plan is to place an intercepting main parallel line to the open ditch and some distance from it. This will reduce the number of outlets to one and will not require any more trench.

Actual conditions of topography on your own farm will seldom permit following an ideal layout in detail, but careful study will suggest some approach to it. Figure A shows a relatively simple layout on a farm having land sloping in all directions. There are but two outlets for the entire farm and the laterals are as long as conditions of topography permit.

TILE ARE LAID by hand. Natural irregularities on edges permit water to enter. The line is then "blinded" and the trench filled by hand, or better with a bulldozer blade.

NO TILE LINE is better than its outlet. These lines are protected with concrete head walls to allow surface water from the open ditch to flow over the walls, preventing washout of tile. The open ditch should be cleaned to lower level of standing water.

THESE TILE are more than 100 years old. B, C, and D were hand-made on a potter's wheel. C is from a line still working perfectly after 110 years. A, horse-shoe type, was laid on boards. Modern tile are simpler and much stronger.

Depth and Spacing

Depth and spacing of drain tile are two factors that have a lot to do with the efficiency of tile drains and the cost of the system. The rate of movement of water through soil and subsoil varies greatly with soil type. The problem is so complicated that only general principles can be given here. With advent of heavy farm machinery no tile lateral is safe against mechanical injury if it is not at least two feet deep. Four feet is about the maximum practical depth for farm ditching machines. Mains eight inches to twelve inches in diameter should be at least three feet deep to the bottom of the trench.

Depth and Spacing Factors

In general, the more porous the soil and subsoil the deeper the laterals should be placed, and the farther apart they may be spaced. Peat, muck and sandy soils may often be most efficiently drained at a depth of four feet with laterals one hundred or more feet apart. Land having clay subsoil may require a depth of only thirty inches and a spacing as close as two rods. Some of the deep prairie soils of the corn belt require a depth of three to three and a half feet and a spacing of seven to eight rods. Certain soil types have an impervious layer from the plow sole to a depth of twenty-eight or thirty inches, with a more pervious soil below this. In such soils the tile should be placed below the impervious layer to a depth of thirty-two to thirty-six inches.

There is little danger of overdraining a heavy clay soil. Cost is the only factor to keep us from recommending closer spacing. The acre value of the crop and its tolerance for water are important factors in determining spacing. I once laid out a drainage system for a commercial florist in a heavy Mahoning soil. The tile lines were spaced four feet apart. A spacing of forty feet would have been about right for general farm crops in the same soil. Some river bottom soils have more complete drainage naturally than some heavy soils would have if drained with tile lines four feet apart. It is well to note carefully the width effectively drained by any existing tile lines on your farm.

Installing Tile Drainage Systems

After the design of the layout has been the most practical depth and spacing should be determined in conference with the engineer. Calculate the number of tile and fittings required. And order only good tile. The manufacturer's own grading will probably have about the same meaning as the term "grower's grade" as applied to fruits and vegetables. The only safe and definite specifications for drain tile are those adopted by The American Society for Testing Materials. This society recognizes three grades of drain tile based upon (1) crushing strength, (2) absorption of moisture, (3) resistance to freezing and thawing. The three grades are (1) Extra Quality, (2) Standard Drain Tile, and (3) Farm Drain Tile. By calling the lowest grade "Farm Drain Tile," one may get the wrong impression that any old tile are good enough for farm installations. It is usually best to purchase either Standard Drain Tile or Extra Quality Tile.

It is possible to make good connections by cutting and chipping ordinary tile, but factory made fittings result in a better job. Practically all tile companies make the necessary fittings.

Hand vs. Traction Ditching

Hand ditching is slow and expensive and few workmen possess the skill to do a good job. A traction ditcher is the best machine to do a careful job quickly. This machine will cut to an accurate grade and leave the bottom of the trench in perfect condition to lay the tile. Under average conditions a skilled operator will dig at least one hundred rods of trench per day.

Five rods is considered a good days work for hand trenching. Hand digging is limited to spring and late fall when there is enough moisture in the soil to make digging easy. Some hand ditching is done on small farms or fields because it may be difficult to secure a traction ditcher for very small jobs

Traction ditchers are generally owned by contractors who specialize in farm drainage work. Many operators have had years of experience in this work and not only understand the operation of the machine but can do a good job of planning the layout. Most of the farm ditching machines are made by the Buckeye Traction Ditcher Company, Findlay, Ohio. In most cases the manu-

TABLE B

Diameter of tile in inches	Acres drained for grades from 1 inch to 12 inches per 100 feet								
	1"	2"	3"	4"	5"	6"	8"	10"	12"
4	4	5	6	7	8	9	10	11	12
5	7	10	13	15	17	19	21	24	26
6	13	17	21	25	28	30	34	38	42
8	27	37	45	53	60	67	75	85	95
10	48	70	85	95	105	120	135	150	170
12	80	110	135	155	175	195	225	250	275

This table shows the approximate number of acres that may be drained by various sizes of tile lines when laid at various grades. It applies where the tile is used as a main to carry water from a system of laterals only, and not as a storm sewer.

facturers are able to refer farmers to the location of the contractor nearest to their farm.

The size of machine commonly used for farm work costs about $4,500. The cost per rod for trenching will vary with depth of trench, size of job and type of soil. In most cases it will be from 60 to 80 cents per rod.

The total cost per rod for installing 4-inch laterals will be about as follows: Assume an average depth of trench of 32 inches and a spacing of 4 rods between tile lines. This will require 40 rods of drain per acre. Four-inch tile will cost about 72 cents per rod. The cost of digging the trench about 75 cents per rod. Laying the tile and backfilling the trench will cost about 10 cents per rod. This will be a total of $1.57 per rod or $62.80 per acre for a 4-rod spacing of laterals. This same trench will take any size of tile from 4 inches to 10 inches in diameter.

Grading for a Tile Line

Accurate grade is important. The amount of grade may vary from an inch per one hundred feet to as much as is available. Two inches or more per one hundred feet are desirable for four inch laterals, but there are many miles of laterals laid as flat as one inch to the one hundred feet. If the trenching is done by hand, and there is plenty of fall, a skilled workman can do a fairly good job of grading by watching the water in the trench. The difficulty here is that you never know how deep you will be when you reach the upper end of a line. Accuracy of grade is always more important than the actual amount of fall per one hundred feet.

For all machine work and most hand digging the cut and grade should be determined by the use of a good surveyor's level. That is why it pays to secure the services of a drainage engineer or an experienced contractor. Some ditching machine operators are qualified to do this work. No man, however skilled, is qualified to determine grade by eye alone. It is easy to bury your mistakes when putting in tile.

Use care in laying the tile. Be sure they are in good alignment. In ordinary soil it is not necessary to crowd the tile close together end to end because all water entering the tile line enters at the joints. Cracks of an eighth of an inch are not objectionable. The tile are generally irregular enough at the ends that merely touching them together, without fussing too much about the joint space, will be all right. Large cracks resulting from laying around curves should be covered with pieces of broken tile. I do not consider it necessary or desirable to cover the joints with pieces of roofing paper as it sometimes done. Under some special conditions, such as laying tile through quicksand, very tight joints may be required.

TILE WILL FILL with silt if the outlet is stopped up or the grade is faulty. There's only one way to clean the line—dig it up.

The tile should be "blinded" as soon after laying as possible. Blinding consists of placing just enough soil over the tile to cover them. This should be done by hand, and carefully. Blinding prevents the tile from being forced out of alignment when filling the trench by machinery. Back-filling the trench may be done in a variety of ways. One of the best is by use of a simple bulldozer blade on a general purpose tractor. A bulldozer blade for your tractor will cost about $160.00 but it will pay for itself with a few jobs of ditching and grading.

Some Special Conditions

(1) *Spouty Spots on Hillsides*—Spouty areas on side slopes are common. They are a nuisance to farming operations and are often hard to drain. They occur where a horizontal impervious layer of soil, overlaid by a more porous soil, comes to the surface on a side hill. Water filters easily into the pervious top layer until it reaches the heavy layer, then moves over this layer to the surface, causing spouty areas or "wet weather springs." The wet spot will always be below the point where water reaches the surface. The common practice is to run a tile line up into the wet spot and stop. This is wrong, for the water has reached the surface and must move down through heavy soil to the tile. The better solution is to run the tile line up above the wet spot and branch it out both ways. This will intercept the water before it comes to the surface.

(2) *Grassed Waterways*—It is ordinarily not practical to install a tile main large enough to carry surface water as fast as it accumulates in low areas or "draws". Grassed waterways should al-

(Continued on page 103)

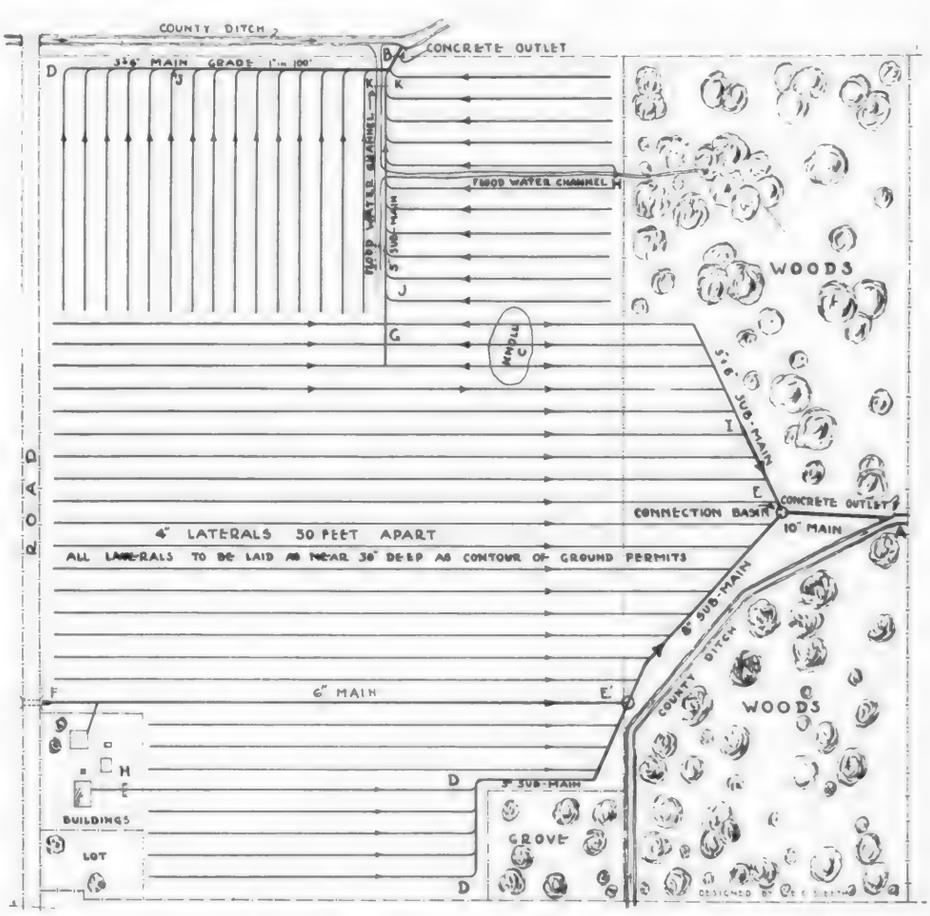


FIGURE A: DRAINAGE ENGINEER'S plan for a tile system on an Auglaize County Ohio, farm, put down several years ago. Note the economy of main lines and how the variations in topography have been handled. Note how multiple outlets of laterals into the open ditch have been eliminated by a main line laid parallel to the ditch.

ROLAND AYLES BELIEVES ears were made to hear with and not to be washed. In her farm home near Laurel, Indiana, Mrs. Ayles starts early Saturday afternoon to tidy up her family for the weekly shopping and social visit in town.

HOOSIER

Saturday Night

Six days a week, sleepy little Laurel (pop. 550) is a little dot on a dusty, country road. But on Saturday nights it turns into a boisterous hoyden.

THE 1937 Dodge nuzzled up to the curb on Pearl Street, in front of Jingles' general store. The driver, Oscar Leach, turned around to see that his trailer was in line with the curb, and then sat at the wheel for a minute, looking down the street.

No one moved because there wasn't anybody there. It was just three o'clock on the first really warm day in April; the air was light, and the perfume of apple blossoms was strong enough to make a bee drunk just smelling it. Oscar, despite his 180 pounds, stepped easily out of the car and inspected his trailer load with a casually hopeful air. In the front of the trailer were several score bundles of sassafras, each tied with a brown string. Wedged into the back of the trailer was a berry crate containing a dozen or so Plymouth Rock roosters of fryer size. On top of the crate was a mound of spring onions. In a

back corner, piled on some newspapers, was a large bunch of late daffodils which Mrs. Leach wanted the Methodist minister's wife to have.

Everything looked right to Oscar and he picked up a handful of spring onions and headed down Pearl Street, the single business street of Laurel, Indiana, toward the cafe where he traded off the onions for a couple of cold beers. The cafe, like the town, was empty, save for the barkeep. Laurel is an Indiana Saturday night town and Oscar was usually its first customer.

After emptying his second beer and passing a word with Kermit Davis, the barkeep, he headed back to his trailer. He calculated he ought to get about $10 for his load, enough to buy this week's supply of store groceries. In front of the Jingles' store, on a stone ledge, Oscar sat himself down to wait.

It was 3:30 and it would take Laurel the next four hours to fill up. Oscar liked to watch it fatten out on Saturday nights, which performance, like the Old Faithful geyser at Yellowstone Park, it delivered on schedule. Sucking a bit of sassafras bark, Oscar leaned back on his stone seat, tilted

THE SECOND HAND STORE is the repository for whatever is left when a family moves. It does a brisk trade with young couples just starting out and moves an occasional antique to tourists. The talking movies are held during the summer in the open.

THE LIARS' BENCH draws wit and philosophy out of Laurel and the countryside in conversational sallies into politics, gossip and sly yarns. There's some trading done here, too, and it's a good place to pick up hands for the harvest fields.

ON THIS COURT behind the I.O.O.F. hall in Laurel small boys blow off excess energy. A Hoosier boy makes a pass at every hoop he sees, and it's a rare barn that hasn't a hoop nailed to the wall. If he has no ball, his cap or a stone will do.

his hat to ward off the sun, and waited contentedly, his ear accepting the occasional breaks in the silence of the late afternoon. A pig in a pen next to the town's one room stone jail, fed a few hours earlier because it was Saturday, grunted loudly as it ate. A cow in a pasture, right off Pearl Street, bawled into the wind, and a horse, shut in a nearby stable when it wanted out, neighed and kicked at its stall. A woodpecker explored a dead limb in a tree near the old Conwell house. Oscar took the sounds in, interpreted them and understood them.

But in the town, nothing had moved. In the center of the 80 yard business district, where Pearl Street is cut by State Highway 121, stands three stories of painfully plain brick, the I.O.O.F. hall. At 4 o'clock, an hour before Oscar figured on making his first sale, Bert Mosier, the town marshall, sauntered out of the hall and into the middle of the street to direct a non-existent traffic. His blue uniform was dusty and wrinkled, and from his side dangled a six shooter, loaded. Bert nodded to Oscar and Oscar moved his arm in greeting. Bert looked up and down the highway, and walked over to the trailer and picked up an onion.

"Nice rain we had last night," said Bert.

"Too wet to plough," said Oscar. "How you been?"

Bert sampled the onion. "Have some," said Oscar, offering six, and forgetting his question.

"Don't mind if I do, thanks," said Bert. Some things about cops are the same everywhere, Shanghai, Fifth Avenue, or Laurel, Indiana.

A car appeared over the top of the hill, heading down State Highway 121, and the town marshall went out to meet it. It had a Maryland license and was making sixty. The driver of the car saw the marshall and braked to twenty in forty feet. He took in the marshall's six shooter and brass badge and gave him a wide berth, crowding toward Oscar's Dodge, and then speeded up beyond the intersection. The two men from Laurel looked at each other impassively; there was neither a grin nor a look of satisfaction; that is unless you knew the men mighty well.

A few townspeople strolled down the street and into three stores, the cafe, the grocery, and the milk station. They were "extra-help," mostly relatives of the store keeper, asked in to help with the Saturday rush. A few kids, escaped early from Saturday afternoon chores of hoeing the garden and stocking up the wood pile, began to bounce a rubber ball on a gravel

BUTTER FAT BUYS his next week's groceries but most of his cream check will go into the sock. Effie Bennett, manager of Laurel's cream station, tests the cream, weighs it, and sees that it is loaded on the trucks to the city. Peak business, she says, comes on Saturday night when the farmers bring in their cream and ask for their checks.

court next to the I.O.O.F. hall. They made fierce defensive blocks and dribbled long runs, shadow playing Indiana's great game of basketball. In that part of Indiana every post over eight feet tall has a barrel hoop tacked to the top of it. If there isn't a basketball handy they toss up a cap, a stone, or even a stray cat. Kids there will make anything go through a hoop.

The sun began to drop behind the trees. A slender forsythia bush, thrusting out between the sidewalk and the curb, sprayed the street with a few bright yellow petals that fell softly with the brisk puff of a spring evening breeze. The blue neon sign of the cafe snapped on and Oscar moved over to make room for company.

It was the company of acquaintances, not of strangers, and that was why Oscar and those like him came to Laurel most every Saturday night. Fifteen miles down the road was Brookville and ten miles north was Connersville; both booming business towns of several thousand. In Connersville and Brookville, the farmers and their kin folk lose their identity and become customers, and movie patrons, hustlers along the sidewalk, moving when the green shows, stopping with the red.

In Laurel on Saturday night, everybody knows everybody else, and that's why they come. Saturday night towns, like Laurel, never get the tourist trade. No one except a native would believe that sleepy, empty, week-day Laurel is a hoyden on Saturday night.

Bob Ayles Goes to Town

Within five or six miles of Laurel, around six o'clock of a Saturday night, farmers' families are making their preparations to come to town. Among them is Bob Ayles, 30 years old, father of five children, and a fourth generation Hoosier.

As Bob Ayles steps on the starter of his tired Chevy on this cool April afternoon, he does a mental turn around the place. Cows are out in pasture; horses are fed; the brooder stove in the chicken house is filled with coal; the cream and eggs are in the back of the car. If Cleo, named after his third grade teacher, who was a mean one, picks this time to have her calf she'll probably get along all right for three hours. But those plow-points for the blacksmith to sharpen are still on the back porch. He gets out to pick them up and on a shouted afterthought from his wife gets two more diapers for the baby.

ROLL WIGGINS, Laurel blacksmith for fifty years, gets only a rare job of horse shoeing now, but bits of iron mongery, harness repair, and plow sharpening keep him fairly busy. When he retires there'll be no one to carry on; his shop will close for it is already an anachronism, even in Laurel. His bellows is operated by a motor and there's an electric light over his anvil.

MRS. AYLES looks at a city-made rag rug in Fosler's general store, which obliges with a line ranging from a rattle to a set of harness. Mrs. Ayles prefers the friendliness of Laurel's clerks to the fast service in the big stores at the county seat.

The Ayles rent their farm, 200 acres of good and bad Indiana land, three miles from the village of Laurel. The glacier didn't quite make it to this southeast corner of Indiana and there are plenty of hills to put up with. The Ayles keep 80 high rolling acres in permanent pasture. A few feeder cattle graze here. The cattle don't get the corn though; it goes to the hogs. Last spring Bob Ayles was one of the lucky ones. He had 155 head ready for the market when the OPA went off. This spring with corn plentiful and hogs moderately high, it looks good again.

For Bob Ayles, his wife, and five children the year is divided roughly into 52 work units. Like most mid-west farmers

COUNTRY KIDS are not conditioned to the handy ice cream supply at the corner drug store. The Saturday night cone is a real treat after a week devoid of sweets.

THE STATELY HOMES of England, with their spacious lawns, servants in every wing, and caste society were the original patterns for America's first small town social order. Laurel ran the cycle, from riches to rags. There's little gracious living in the big houses now.

the unit starts on Monday morning and goes through to Saturday afternoon. From sunrise to sundown his line of fences hold him as securely at home as high walls. But this is Saturday. Today he quits an hour early in the field, cheats a little on the cows' milking time and has the chores done by 5 o'clock. The supper was mostly warmed over from noon dinner. His wife spent most of the afternoon scrubbing the kids and getting them dressed in their starched clothes.

Saturday night in Laurel is a habit with Bob Ayles. All during the week he looks forward to it and he probably will make these weekly trips when he is a grandfather. Some Saturdays he has to combine the trip to Laurel with a run on down to Brookville to the International dealer to get parts. It is usually Laurel though; he knows the people there. You might save a little at chain stores in Brookville or Connersville, but the clerk doesn't know you and you don't know him. You're just another farmer who makes his Saturday night a mad scramble. In Laurel you can go to Jingles' or Fosler's and buy about anything you want from nails to coffee, and enjoy yourself talking to friends while you're doing it. Your neighbors come for the same reasons, to sell the cream, the eggs, and some produce, but mostly to shop and visit.

The fields along the road to Laurel tell a story any farmer understands. As they pass the unplowed bottom corn land of a neighbor, Bob Ayles turns his head toward the back seat and says, "Guess the new cylinder head for the Jessop's tractor didn't come yet."

Up ahead, the town water tower pokes its head over the hill. Route 121 winds over the creek bridges and up past the cemetery. Then the town comes into view. The cool valley air will have the bite of frost tonight and Laurel seems to anticipate it. There is a soft blanket of smoke pulled up about the shoulders of the stores and houses.

At the top of the hill the state highway marker announces, "Laurel, population 511." Bert Mosier, the marshall, is leaning against Oscar Leach's trailer, eating another onion. He straightens up when he

THIS HOME, with its wrought iron railings and servants quarters, and a rear wing the size of a small palace, was built by a Laurel banker during the affluent days of the quarry boom. It is now empty and for sale. The price, they say, is $10,000. In Laurel today, that's the moon.

sees Ayles' car coming down the hill. Saturday night is just about the only time in the week when Bert has anything to do and it's a toss-up whether he will have to lock up anyone tonight. The village jail, built solidly of local limestone, usually holds the principals of the Saturday night fight until they sober up. If it's cold, uncomfortable cells won't do the trick, the aroma from the neighboring pig pen will.

Ayles noses his Chevy into the driveway beside the cream station, opens the boot, and lugs a can of cream into the station. His wife follows because she wants to talk to Effie Bennet, the manager. Effie has run the cream station for seven years and is the clearing house for neighborhood gossip. She takes charge of Ayles' can of cream in a business-like manner, meanwhile throwing out bits of choice information about what has been going on during the past week. Ayles finds an old friend there, a neighbor who went to school with him, and like a couple of fencers probing for the weak spot, they begin negotiations for trading a load of fence posts.

In a momentary pause Ayles' gets an opening and asks, "How much is cream today, Effie?"

"Eighty cents a pound," she says. "Same as last week."

"That's the price of butter," says Mrs. Ayles. "I don't see how they make any money buying cream for eighty cents and selling butter for the same price."

"It's the milk they mix in with the butter," explains Effie, happy with her learning. "The government allows them to mix some skim milk when they churn the cream. That way they get eighty cents a pound for skim milk."

One of the Ayles children comes to the door and asks, "Mom, can we get our ice cream cones now?"

Outside at the car Mrs. Ayles gives each of the three older children a nickel and they race off. Ayles sees someone he knows sitting on the liar's bench in front of the filling station and saunters up and sits down. Everybody says "Howdy" and Rayburn Jenks, who buys cattle for a Connersville slaughter house, asks Ayles when he is going to let his hogs go.

"Out of corn in two weeks," says Ayles, and I'll either have to sell 'em then or buy corn. I'll know next Saturday when I'm in town."

OLD LAURELITES, proud to be called Hoosiers and proud of their birthright of respectability, look askance at strangers from across the River who swarmed into the county during the prohibition era to set up stills in the hills. Like the ancient I.O.O.F. hall, they are four-square against outlanders.

Mrs. Ayles has taken a basket of eggs out of the car and gone over to Jingles'. As she opens the door an old, familiar odor is wafted out, the unmistakable odor which a country store accumulates through the years. It is one smell, yet there are many smells compounding it. Salt mackerel, cheese, kerosene, rubber boots, harness, dry goods, and the ripening counter fruit, mingling helter skelter on the shelves all contribute to the mixture. There is a touch too, of the unwashed human, for baths will come just before going to bed on Saturday night. That way, you won't take cold.

Mrs. Ayles slides her basket of eggs on the counter, and Jingles, who used to give her a stick of candy when her mother carried *her* to the store, comes up to the counter.

"I have some of that cheese you like," says Jingles, counting the eggs, "and plenty of sugar."

Mrs. Ayles orders cheese, coffee, sugar, the usual supplies which must run her through the week. She takes a card of shirt buttons and asks Jingles to let her have his wallpaper book until next Saturday. She'll paper the sitting room sometime after spring house cleaning. She tells Jingles she'll leave her groceries and pick them up later.

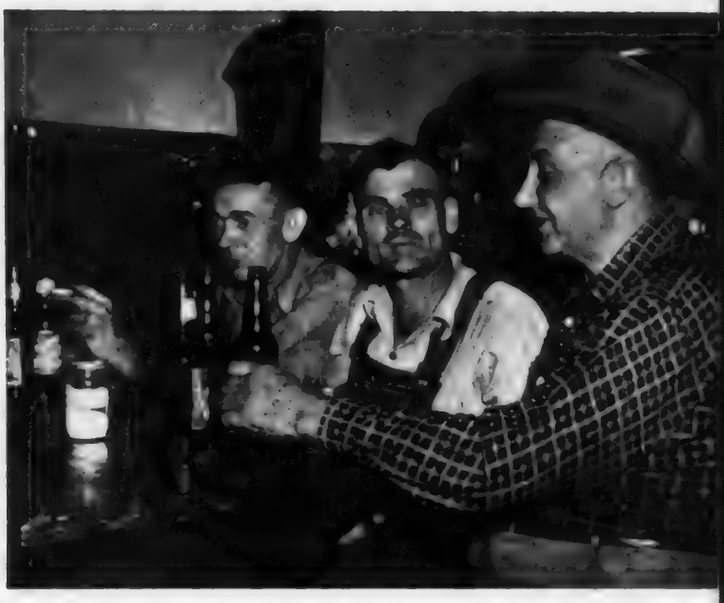
A member of her church committee on the annual spring pie supper stops to tell her that the committee will meet next week at the church and she hurries out, for heaven only knows what the kids are doing. Sure enough, there's Johnny, standing by the car, crying. He says he's been bit by a dog and his cone has been stolen.

"One of them Kentucky hounds comes up and grabs his cone," a man volunteers from his seat on Jingles' bench.

Mrs. Ayles ire rises at the mention of Kentucky. Although she lives in the country, she always seems to be having trouble with the Kentuckians. Like the people of Laurel, she looks on this new element of the town's population as alien people who gave the town a bad name during prohibition days with their stills and their Saturday night sprees.

She buys Johnny another double-breasted cone, warns him to stay in the car until

SATURDAY NIGHT means a lot to the people who live in the cabins in the hills south of Laurel. This 16-year-old mother arrives in the early evening, will stay for the dance in the Redman's hall.



IN LAUREL'S one saloon a juke box and fancy booths have replaced the brass rail and the quartet which sang "Sweet Adeline" in the rousing days of the quarrymen.

THE VILLAGE JAIL, whose noisome cells have reformed many a brawler, stands in the canal basin near the ruined stables where stone haulers kept their teams.

he finishes it, and walks up the street to Fosler's, where she is to meet her husband. As she passes the saloon she is almost knocked down as the screen door bangs open and Bert Mosier emerges with an arrest.

She hears somebody say, "Fight over a girl. Hit one of our boys with a beer bottle."

Mrs. Ayles is mildly concerned. These Saturday night fights, usually between the town boys and the outsiders from down in the hills, are part of the old familiar Saturday night scene. She finds her husband at Fosler's sitting on a stool by the shoe counter, one foot in a shiney rubber boot.

"Good rubber boots back in the store again," he says. "Thought I'd need a pair to do that ditching in the meadow."

"It's nine o'clock," says Mrs. Ayles, "we'd better get the children home."

Ayles pays for his boots, reminds Fosler to order two milk cans for him, and walks over to the car with his wife. At the Church of the Nazarene mission in the old hardware store the Saturday night meeting is about to break up. They're singing "Bringing in the Sheaves" and Mrs. Ayles starts to hum the melody as she gets into the car. The twins are asleep on the back seat and Johnny stops teasing his sister when he sees his mother.

Other people are leaving too. The little knots of people in front of the stores are shrinking. Two die-hards sit steadfastly on the stone ledge in front of Jingles. There's still a touch of winter in the air and it's not too comfortable to stand around and talk. Later in the season it will be pleasant but now it's only nine o'clock and the cream station lights have been off for a half hour, and Jingles has turned off the lights over his desk in the back end of his store.

Soon the street will be dark. Kermit Davis, the barkeep at the saloon, will ask the party in the last booth to please finish up because he's closing. Bert Mosier sees the tail lights of the last car wink out over the hill. He will take a turn around the old canal basin where the jail is and then go home to bed. Another Saturday night has come—and gone.

The Immaculate Pig

BY GEORGE E. LAYCOCK

THERE'S always been a gamble in the hog business. Many of us in the midwest look at hog farming about the way we do at poker playing; taking credit for the profits, and blaming luck for the losses.

I remember how we raised hogs in the hills of southern Ohio when I was a boy. There wasn't a right and a wrong way to do it. There was just one way—the way everyone did it. Out behind the barn was a hog lot. It was usually just large enough for a hog house, a trough, and a mud wallow. These were our standard equipment.

At chore times we carried a basket of corn out to the pen and dumped it in on the ground. It had a contrary habit of rolling into the wallow, so that with their corn the hogs got half a mouthful of mud saturated with parasite eggs and disease germs.

A large part of the farmers in the midwest still stick pretty closely to this mud lot method. They raise small litters as regularly as farrowing time comes around. The longer they raise hogs in the same old lot the better the hidden enemies of swine become entrenched there, and the worse the farmer's luck grows.

In the past few years many farmers have told themselves that they had to do something about their "luck" or change to growing petunias.

In their search for a solution they discovered a plan for swine care that called for some extra work, but promised more profits. This plan is one of the best things that has happened to the swine business in the past twenty-five years. It is a system of sanitation for hog farms, worked out first by the U. S. Bureau of Animal Industry. Because the idea was first tested on McLean County, Illinois, farms, it was called the McLean County System. It soon became a fast friend of the farmers who tried it.

They found that they raised their usual number of pigs on two-thirds as many sows. They raised more pigs per litter, and saved a higher percentage of those born alive. Under the new sanitary methods they had an average of one runt to every 100 pigs, while before their books had shown 18 of these midgets to the 100. Farmers who use this system shoot for 95. percent of pigs born being brought up to market weight.

Under the McLean County plan of clean pigs the farmer's pork was ready for market seven weeks sooner.

The constant success of this plan during the last several years has proved its value. G. W. Putnam, of Madison County, Ohio,

CLEAN BEDDING, heated creeps, and antiseptic houses like the one on the opposite page will produce more pigs quicker than the old mud lot method. Parasite eggs accumulate in the mud and are eaten along with the corn ration dumped over the fence.

PERMANENT HOG HOUSES with concrete floors and painted or tile walls can be flushed often, kept clear of litter and mud, and disinfected easily and quickly.

is convinced that it pays. His farm produces about 1000 pigs for market every year. "We were hit here once," he recalled, "with infectious white scours. Don't know what caused it, but do know that we lost 500 little pigs in three weeks. The sows would come into the farrowing house and drop their pigs and they would all be dead within 72 hours. There wasn't anything we could do about it then. For a long time after that we didn't even let visitors on the farm, for fear they would bring a hog disease with them." Putnam has relaxed now for with his sanitation program, one of the best in the state, diseases are under control on this farm.

On one farm I was told by a farmer, "We woke up one morning and discovered we had Bang's disease in 33% of our hogs. Sanitation helped clean that up, but it took two years." Nothing could move from one end of this farm to the other without first being sprayed with disinfectant. Now his sows are blood tested as regularly as they are bred and if one shows even a trace of the disease she goes.

How to Clean Your Farm

All this listens well, but you are asking how you can go about this task of making your farm a disease free spot on the rural landscape. Pushed into a capsule for quick swallowing, here are the ingredients. It takes plenty of hot water and soap, a supply of lye and disinfectant, and equal parts of common sense and muscle. Here is the way to mix these ingredients into a more profitable hog business.

Hogs often die young. During the first four months of their lives they are tender porkers susceptible to almost any stray disease or parasite that happens along. To keep his young pigs alive the big scale hog farmer has to keep diseases away from them for when the two mix it isn't for profit.

How to Care for the Sow

A farrowing sow needs concentrated care. On those hog farms that raise eight and more pigs per litter, the sow usually gets unlimited attention as she heads for the maternity ward. On the average farm that raises five pigs per litter nature has "been allowed to take her course."

A sow shouldn't be moved into a farrowing pen until the pen has been thoroughly cleaned and disinfected. First sweep all the dirt and cobwebs from the house. Then to kill the germs and eggs, wash the house with scalding water containing one pound of lye to every twenty gallons. Lye loosens the dirt, and the hot water kills the eggs. To get at every crack and crevice thoroughly scrub the house with a broom, or stiff brush.

Then spray it with one pint of cresol solution in four gallons of water. Be sure that this disinfectant covers all walls, gates, and hurdles. When the pens have dried, bed them with a moderate layer of clean dry straw.

Where a large central farrowing house is used a shallow pan of disinfectant should be placed at every door. Every time a person enters the house he should first step into this pan to keep from escorting hog enemies right up to the pens. This is especially true when he has been around old hog lots or sick pigs. In the pans should be a few layers of burlap saturated with some crude oil and a 10% solution of cresol.

If you use wooden shelters for farrowing pens move them to clean range every spring. If the only answer on your farm is to use the same lot year after year you can probably use the plan worked out by one Ohio farmer. His farrowing houses are always on the same spot, but that lot has been blanketed with crushed stone. Summer sun sterilizes this stone floor and cleans it up for another farrowing. Cinders should not be used for sows will eat them and injure their intestines.

The Sow Gets Washed

About five days before her time bring the sow in from the range to the farrowing house. Before she enters this maternity ward, however, she gets a bath with hot soapy water. It isn't difficult to wash a sow, especially if she has been washed before. Bob Duncan, a farmer in Madison County, Ohio, says, "Hogs don't mind being washed. They just stand there. Oh, once in a while you will ge a restless one, but generally it's no trouble at all." Bob cares for a herd of berkshires that sends 700 hogs to market every year, and he loses very few of the ones that are born alive. Be especially careful to clean the sows teats and udder to protect her offspring from getting fresh parasite eggs with their first morning's milk. Then thoroughly clean her feet to prevent her from tracking diseases into her newly scrubbed pen.

Some farmers will not have the time nor inclination to wash sows. If the sows

A BURLAP SACK saturated with crude oil and cresol placed in a pan near the door will liquidate the bugs on your shoes.

are moved to a clean field five days before farrowing, nature will do a pretty good job of cleaning.

After the sow has her bath she should be sprinkled with a disinfectant solution to kill lice and control mange. A good mixture for this is three pints of kerosene, four of crude oil, and a pint of cresol, in four gallons of water. Sprinkle her hide with this liquid and spread it over her body with a brush or rag. Some breeders say straight oil causes abortion.

Clean Pens Often

Leave sow out of her pen to walk around for about an hour after she has farrowed. She will clean herself in this way. Then she should be confined to the farrowing pen for about 5 days. Clean her pen once a day during this period of recovery, taking out all manure and wet bedding. Then disinfect it before adding new bedding. This cleaning takes about 15 minutes of your day. In cold weather it is best to dry clean the pen to keep the straw dry. Keeping little pigs on damp straw is a quick way to give them scours, and straw stays damp longer in cold weather.

Haul the Sow to Pasture

When the pigs are about 5 days old they should be moved from the farrowing pen to clean pasture. To keep them in the pen longer will court anemia. An important part of your sanitation program includes a free ride for this family from the farrowing house to their range. The ordinary plan of driving them down the lane and through the old hog lot is dangerous. The farmer who keeps his pigs off the ground during this period upsets the long range plans of any lurking parasite.

A hog box on runners is about as handy a method as you can find for this move. This box should have an upstairs floor for the pigs, and the sow should be loaded in below them. Some field houses are built on runners, and these are pulled to the farrowing house to be cleaned up, and disinfected. When the sow and litter are ready for pasture they are hearded into this box and dragged to the meadow, home and all. If they are farrowed on clean ground, as they are in Indiana, this is not a factor.

Hogs In Your Rotation

The most common and the best known way to provide clean pasture for hogs each year is to fit them right into your crop rotations. Pasture the hogs on the meadow, so they are on a different part of the farm each summer. If they should drop diseases or parasites on this range, sunlight and cultivation will clean it up again before hogs return in three years.

Hog parasite eggs are passed off in the manure of infected pigs. They enter a dormant session on the ground and lie there quietly until some other hog picks

(Continued on page 133)

OPEN KETTLES and some scrap lumber will provide the hot water needed for disinfecting the farrowing pens and washing the sow if you haven't a heating system.

THE EXPECTANT MOTHER gets a soap bath (don't forget her feet) in warm water as she enters the maternity ward. Then spray her with disinfectant solution to kill lice.

AT FARROWING TIME the movable hog houses are taken from storage, where they have been painted and disinfected, and hauled to a clean spot in the clover field.

Oats

By T. A. KIESSELBACH

WHEN the transition from horse power to tractors was at its height on American farms a few years ago, the viewers-with-alarm predicted that oats would follow the horse into oblivion. There was a time when every quartersection farm had its six work horses, a saddle and buggy horse, and one or two colts, all oat burners. Few oats were fed to other animals; when a farmer got rid of his horse, he was very likely to quit raising oats.

Then the news got around that for cows and hogs and chickens and sheep, oats stand right up near the top as a growth and milk producer. What is more, animals relish oats both as a straight feed and in mixture.

Oats average 12 per cent protein, almost as much as wheat; fat content is 4.7 per cent, more than corn. Its total digestible nutrients are 71.5 per cent as compared to 80 per cent for corn. It contains about 10.6 per cent of fiber, mainly accounted for by the hulls. It lacks vitamin D and has little A.

The feed men say it is the ideal horse feed, for it doesn't wad up in a horse's stomach, and contains all the nutrients to keep a nag in good condition even under the hardest work. Thoroughbreds, highly trained to produce a specialty, speed, thrive on oats. It's their main feed.

It is especially recommended for ewes, young lambs, brood sows, young pigs, goats, and as a starter for fattening cattle. Feed experts as well as working stock men include oats in most of their feed formulas for all farm beasts and birds. Young chickens do especially well on the whole oats, an old superstition that hulls aren't good for them having been exploded.

There has also been a pleasing increase in the popularity of oats as a human ration. Our good friends in Scotland, who know a good thing when they eat it, wouldn't think of starting off the day without a mess of oatmeal porridge. Oats have a lot of competition in the breakfast food field here in America, but those who know the delights of hot oatmeal covered with thick cream and sweetened to taste vote a straight oats ticket.

Farmers like oats as a crop. It is clean and pleasing to plant and harvest, it is not tempermental, and it doesn't demand the pampering with rich soil and large fertilizer dosage that some crops do.

For all these very good reasons, oats suffered only a brief eclipse when the horse went out. It now ranks third among the nation's grain crops in acreage, 42 million, corn leading with 91 million, followed by wheat with 65 million. It's way ahead of barley, which as an 11 million acreage, and rye, with about 2½ million. In a good year the country produces 1,547,600,000 bushels of oats.

This cosmic number of bushels is not chicken feed and it wasn't grown without a great deal of attention to the selection of seed, the planting and cultivation of the crop. The fact is, there is a new epoch at hand in the growing of oats, for plant breeders have been accomplishing the same kind of miracles in oat grains as they did when they came out with hybrid corn.

The oats which our grandfathers planted were pretty sorry examples of cereal crops. They were not much better than the wild oats referred to often by moralists. In 1875, after years of painstaking labor, an unsung hero, Cyrus G. Pringle, brought out a new improved oat which soon became popular as Pringle Progress.

From that time until 1939 only slight improvement was made in oats. Along with most other crops the existing varieties

AN IOWA FARMER In his crop of Clinton oats, shoulder high at cutting time. On this field the old Tama produced 53 bushels per acre a few years back. This crop will run near 80 bushels, and the abundant straw will make good roughage and bedding.

became contaminated with rusts, smuts, fungi and other weaknesses to such an extent that getting a good crop was as much of a gamble as a horse race. Horses were going out too, and it indeed looked like oats were going to take the count.

Then the nutrition experts and the plant breeders stepped into the breach—the feed experts to explain the value of oats as a stock ration, the plant breeders to distribute the new disease-resistant, prolific varieties.

Oats got up off the floor, and went on to win. Because of their resistance to many races of stem-rust, leaf-rust, and smut, together with early maturity and strong straw, the new varieties have greatly reduced the hazards of disease, lodging, and excessive heat to which the older kinds are subject. The effects on yield and quality of grain are phenominal. When the new types are teamed up with good field management practices oats become a money crop. Heretofore, their returns in money value have been distinctly less than from corn and wheat where these crops are adapted. Although their feed and food value was recognized, they were usually grown primarily for the purpose of providing a better distribution of farm labor and for bringing about changes in the crop rotation. The new varieties have put the dollar sign on the crop and put them on an income level with corn and soybeans.

Regions of Oat Production

There are three important regions of oat production in the United States. (1) The spring-sown common-oat region of the North Central states extending north from the southern boundry of Nebraska and westward from central Ohio and Michigan to the eastern third of Nebraska and the Dakotas. This area comprises about three-fourths of the oat acreage of the United States. The varieties most suitable in this area are derived from a species native to western Europe. (2) The spring-sown red-oat region of the Central states, lying as a transition area between the common white-oat region of the North and the winter-oat region of the South. Red oats are often spoken of as "warm-climate oats." They have their origin in a wild species native to Asia Minor or west of the Mediterranean Sea. (3) The winter-oat region of the southern states in which fall-sown varieties of red oats are largely grown. Regions 2 and 3 together produce about one-fifth of the entire oat acreage of the United States, approximately 7,000,000 acres being within the spring-sown area.

The northern farmer who is up on his toes has heard of Forvic, Eaton, Tama, Cedar, Vicland, Boone, Vikota, Marion, Benton, and Clinton. These are all new names in the oats family and represent varieties that have been released for planting since 1939 in the North Central States of Iowa, Illinois, Indiana, Wisconsin, Minnesota and parts of Ohio and Michigan and the eastern third of Nebraska, South Dakota and North Dakota. This represents the most intensive and important oat-growing area of the world.

New Varieties Through Hybridization

The story of the development of the new varieties is not less fascinating than the story of hybrid corn, but it has been much less publicized. It takes 8 to 16 years to produce and prove a new variety of oats. State and federal experiment stations, working cooperatively over a long period of years, tested all possible varieties in order to find the parents of the new oats. They found what varieties were resistant to stem rust, which ones to crown rust or (leaf rust), which ones smut, and which ones had strong straw, good grain quality, heavy test weight, suitable height, shatter resistance, drouth endurance, and productivity. No one variety possessed all, or even many, of these coveted characteris-

tics. All existing varieties were subject to one or more weaknesses. The virtues of each variety were combined and served as the bricks from which the new sorts with all the virtues have been built.

Hybridization, followed by selection and testing, were combined to produce the new varieties. Although they began as hybrids, their superiority does not depend upon hybrid vigor, as in corn, which must be maintained through producing new hybrid seed for each generation, but in the combination of hybridization, selection and testing. With oats, the years of selection following hybridization fix the type which breeds true thereafter. During the period between the original crossing and the testing of new strains, the hybrid progeny undergoes segregation into many distinct combinations differing in their degree of resemblence to either or both parent varieties. Some of these segregates are found to have the virtues of both parents and therefore excel them in performance. It is from these that the most promising are thoroughly tested and the best finally distributed for farm production.

Varieties in the Money

North-Central Region—It happens that the foundation for all ten new varieties named earlier was laid at the Iowa Agricultural Experiment Station in cooperation with the Division of Cereal Crops and Diseases of the U. S. D. A. After several years of segregation, a number of strains were distributed to other experiment stations for further testing. The outcome was that Iowa brought out Tama, Boone, Marion, and Control. The same program yielded Vicland in Wisconsin, Cedar in Nebraska, and Vikota in South Dakota. One of the most recent varities, Clinton, was released in Iowa in 1946.

Data issued from the various states and the U. S. D. A. concerning the performance of these varieties will be helpful to farmers in making a choice. During eight years of nursery testing by the Wisconsin Agricultural Experiment Station, Vicland yielded 20 bushels or 40% more per acre than the most widely grown other variety, States Pride. Some farm yields of Vicland went as high as 120 bushels per acre in 1942. Forvic, which is reported to be superior to Vicland, was released in 1946 in Wisconsin.

At the experiment station in eastern South Dakota, Vikota outyielded the standard local variety, Richland, by 29 bushels per acre during 2 years while the corresponding superiority of Tama and Boone was 27 bushels. In Nebraska, the once famed Kherson oats lost decisively in its bout with the new Cedar, the latter yielding 57 bushels to the former's 42. This is a gain of 36%. Just a few years earlier the crack variety, Otoe, had been distributed as the last word in oats for much of Nebraska but it "cracked" in the eastern counties under competition with Cedar, which surpassed it by 14% during the same 7-year period. Farther west, these varieties cannot yet be recommended as superior to the best of the older stan-

A MAXIMUM YIELD of oats demands that the planting date be hit right on the nose. The best seedbed is firm beneath with a few inches of loose, friable soil on top. Best seeding rate is 8-10 pecks to the acre; some of the new types require less.

OATS STRAW is tough when damp and if cut in this condition may call for frequent descents from the high binder seat to free the cogs and binding gadgets. Combine varieties of oats are gradually writing an obituary for the old binder.

dard sorts, although farmers were trying them there extensively in 1946.

Pennsylvania reports Vicland to be promising and among its best performers. At the Illinois Experiment Station, Marion yielded 9½ bushels more per acre during 4 years, than did the leading standard variety, Columbia. Southern Minnesota and northern Indiana have had such favorable results with Vicland and Tama that both of these have been recommended and distributed for commercial production. Superiority in Ohio and Michigan appears less clearly marked although Vicland is recommended as first choice in the northern two-thirds of Ohio. Michigan has recently released a new variety, Eaton, which is highly praised.

A New Champ

However good these new varieties are, however startling their performance, all must step to the rear of the platform for a new super-duper variety, Clinton. Clinton is a humdinger. During an 8-year period of testing, from 1938 to 1945, Clinton yielded 81 bushels per acre as against the 66 bushels for Tama and 53 bushels for Richland. In addition to this outstanding top yield in Iowa, it is regarded as most suitable for direct combine-harvest because of its sturdy disease-free straw. It may also be grown without lodging on even more fertile soil than is safe for the other new varieties. Clinton ripens a day or two later than Tama and Cedar, grows two inches taller, and has a somewhat heavier test weight. The advantages of this variety are not confined to Iowa, as it was distributed simultaneously in 1946 for certified production in Indiana, Illinois, and Iowa. Its comparative performance has not yet been fully established in other states, but there is no reason why it won't pan out just as well. Furthermore, the U. S. D. A. and the Iowa Experiment Station say it has not as yet reached the limit of its possibilities. Further development will make it better. Clinton may be purchased from certified seed associations in Iowa, Illinois, Michigan, and possibly a few other states. Write the Iowa Experiment Station, Ames, Iowa, for seed associations having seed for sale. Benton, closely related to Clinton, was released in Indana in 1946.

Central Region—States with different climatic conditions may find or have found that other combinations of parents will produce the best oats. As an illustration, the Kansas Experiment Station released the Osage and Neosho varieties in 1945. This parentage introduced resistance to stem rust, crown rust, and smut corresponding with that in Tama, Vicland, and Cedar. They were developed for the spring-sown red-oat area which lies between the fall-sown oat region in the south and the northern common-oat region. As an average for 20 tests involving 6 southwestern states during 3 years, Osage yielded 47 bushels compared with 38 bushels for the well known standard red variety, Kanota. Farmers are being exposed to all kinds, and time only will establish the final limitations of adaptation of each new variety.

In Nebraska tests during two years, Osage was especially outstanding in central counties, ranking first among the varieties grown. Its yield there was 63 bushels compared with 58 bushels for Cedar and 45 bushels for the two standard varieties, Otoe and Trojan.

Southern Region—Winter type oats are sufficiently hardy to be reasonably safe and certainly practical for most sections of the south. At the Arkansas Agricultural Experiment Station the 5 highest yielding fall-sown varieties yielded 17 bushels (42%) more than the 5 highest yielding spring varieties as an average for 21 years.

The southern oat region also has its new disease-resistant varieties in winter-type or fall-sown varieties. In the northern portion of this region common winter-oats are largely grown, whereas an area of red winter-oats coincides closely with the Cotton Belt proper. The same diseases plague the farmers down there, crown rust, stem rust, and smut. By crossing Victoria and Bond oats onto the standard winter varieties, resistance to crown rust and smut has been introduced.

Among the most promising of the new common winter varieties that have been distributed are Letoria and Stanton, while De Soto, Lega and Lelina are close runners-up. The first two named are most winter hardy. All have short, stiff straw. De Soto is definitely described as a combine variety. In an 8-year experiment station test at Stuttgart, Arkansas, De Soto averaged 65 bushels per acre compared with 58 bushels for the standard Ferguson No. 922, and 41 bushels for Lee.

Outstanding among the new, crown-rust and smut resistant red-winter varieties are Fulgrain, Victorgrain, Fultex, Ranger, Rustler, Quincy 1, Quincy 2, and Camellia. As a 5-year average at the Texas Experiment Station, Ranger yielded about 10 bushels more per acre than the Standard Nortex.

Farmers in the well-defined portions of the sections where the new varieties have been tested will have no trouble in making a selection. Those on the fringes may want to try out several possibilities. In any case, the obvious thing to do is to take up with one of the new varieties—there'll be more oats in the fields come next harvest.

Highest Yields on Fertile Soils

By breeding strong healthy straw into most of the new varieties, the old danger of oats growing too rank and going down on fertile soils has been greatly reduced. It is now possible to plant oats immediately after a soil-building legume is taken off. This is more likely to be done in the drier western portions of the area where corn planted after legumes is somewhat more subject to drouth hazards. In recent years in eastern Nebraska, Cedar and Tama oats have produced upwards of 75 bushels per acre in the first year after alfalfa or sweetclover without serious lodging. This is about double the yield on old ground. Throughout the cornbelt many farmers report 80 to 100 bushels and certainly that represents fertile soils and favorable moisture.

In general, the same rotations should be followed with the new varieties that have proved desirable with those that are being displaced. The crops included and their sequence will vary with the locality. There are innumerable satisfactory combinations, but all contain a forage-legume, or grass-legume mixture, at close enough intervals to keep up the nitrogen and organic matter supply. The new oats serve admirably as a companion crop for clover. Both may be sown at the same time in early spring. After oat harvest, the legume continues with its soil-building growth.

Most farmers arrange their rotations with an eye on corn and wheat; oats is fitted in as a sort of afterthought. A common and very simple 4-year rotation consists of a year of oats planted with clover or grass and clover, a year of forage, and two years of corn. Where winter wheat is grown, it may serve as the companion crop for clover, to be followed by a year of clover, two years of corn and a year of oats.

On soils of low fertility, yields of oats will be materially improved by the use of barnyard manure or commercial fertilizer preceding some one or more of the other crops. Farmers have found that oats do best when they follow corn or wheat that has been heavily fertilized, using very efficiently the residual effects. No fertilizer containing inorganic nitrogen is recommended where crops follow immed-

SOME NEW VARIETIES, like *Clinton*, stand up well in the field until they are mature enough to combine. In some areas cutting with a binder and shocking work best; in others, cutting and windrowing and threshing with a pick-up combine after curing is liked. When the glumes turn a dull white is the time to combine, but the grain must have reached the hard dough stage.

iately after a forage legume, or after an application of 10 to 15 tons of manure per acre, or where moisture shortage may be expected to prove a seriously limiting factor. The use of commercial fertilizers depends on local conditions.

In normal mid-west and eastern soils nitrogen, phosphorous and potassium are not sufficient for big yields. A fair average rate to apply would be 40 pounds of nitrogen to the acre, and 30 pounds each of potash and phosphate.

Oats As a Companion Crop

It is an almost universal practice to sow the clovers in spring with a companion crop such as small grain or flax. The new, stiff-strawed, early maturing varieties of oats are highly suitable for this purpose. Their ability to stand erect greatly reduces the chances of the clover seedlings being smothered out. It has been learned by experience that oats do not provide much more severe competition for the young clover than do the weeds that come up when there is no companion crop, or nurse crop as it was formerly called. Instead of being obliged to clip the weeds a couple of times by the middle of July, it is possible to harvest a profitable oats yield and yet have the clover come on in the stubble. If the oats are not wanted for the grain, they may be harvested for hay in the early dough stage or be pastured along with the clover. In the following year the legume will provide either pasture or two cuttings of hay, or one cutting of hay and a seed crop.

Used as a companion crop, the oats are preferably sown at about ¾ of the normal amount of seed per acre. This will curtail the grain yield very little and yet provides less competition for the legume. The clovers are fairly cold resistant and may be sown as early in the spring as it is safe to sow the oats. Both the clover and oats may be sown at the same time with a combination grain and clover drill. Another satisfactory plan is to broadcast the clover seed, then drill in the oats. This covers the clover seed sufficiently and a good stand may be expected in most years.

Seedbed and Seeding

In most spring-oat regions disking may be substituted for plowing in preparation of the seedbed for oats following corn or other row-crops. This is more rapid and inexpensive than plowing and makes an equally good seedbed. In seasons like 1944 and 1945 with only a few days free from early spring rains, any method pays which helps get the seed into the ground early.

Disks should be kept sharp to do a good job of cutting the stalks. The best oats seedbed is firm below with 2 to 3 inches of loose mellow soil at the surface. Crop residues in or on the surface reduce erosion by rains and wind. It is best to weight the disk and to double disk the field, lapping the disk to keep the soil level. In the Great Plains Area, the subsoil type of cultivator or stubble mulcher as a substitute for the disk or plow is gaining converts. On very heavy soils in the east, fall plowing or very early spring plowing is referred.

Sowing vs. Drilling

Tests by experiment stations in many states show about equal yields from drilled and broadcast spring-sown small grains. Drilling is usually preferred as it insures more even coverage of the seed and more uniform germination. It also requires about one-half bushel less seed per acre to obtain a satisfactory stand. The U. S. Dept. of Agriculture says "8 to 10 pecks to the acre is the best seeding rate." Also "the rate may be reduced somewhat if the obtaining of a satisfactory stand of clover and grass with the oats as a nurse crop is the major objective." If the seed is broadcast, the seed should be sown on a well prepared seedbed and covered by light disking.

Preparation of Seed for Planting

Seed that was combined or threshed with excessive moisture content is apt to heat in the bin during storage and won't germinate well. But one should be practical in matters of seed quality, and claims that heavily graded seed will outyield ungraded seed as much as 10 or 12 bushels per acre should be accepted with a barrel of salt. The fanning-mill is not a grain breeder and its chief use lies in removing trash, weed seed and broken and underdeveloped kernels which can be fed to livestock. If the seed is reasonably clean and sound as it comes from the separator, little if anything, is gained by running it through a fanning-mill.

Oat seed should be treated for the prevention of smut in the ensuing crop. Even though the newer varieties are described as resistant to the smut diseases, such resistance is not absolute. Seed treatment will prevent an increase in the prevalence of rare races. New improved Ceresan controls the smuts and also pythium root rots and seedling blights.

Time to Plant

Timely planting is one of the most important considerations in growing oats.

DESPITE CLAIMS, the new varieties of oats are not hybrids, although hybridization was used in development. Years of selection have fixed types. Seed will breed true.

OATS STRAW is superior to any other cereal straws as roughage for cattle and other livestock. It pays to run it into the mow or to stack it carefully. The straw and grain should be dry when threshed otherwise both are likely to mold.

Since it is a cool-weather crop, spring-sown varieties should be planted just as soon as danger of severe killing freezes is past. The earlier the planting in the normal planting season the better. This is one place where procrastination does a particularly damaging job for it is the enemy to maximum fields. Farmers who have kept books on planting dates say that each day's delay beyond the optimum date reduces the yield by ½ to 1 bushel per acre. The Iowa Station shows an average loss of about one bushel per acre for each day of delay. As an average for 4 years, the Nebraska Station harvested 69 bushels for April 10th planting, and 49 bushels for April 20th planting. Corresponding yields for the standard Otoe were 54 bushels, 50 bushels, and 43 bushels, respectively, compared with 49 bushels, and 27 bushels for Fulghum. Planting delays reduce the test weight of the grain Excessively early planting usually turns out to be dissappointing too, because stands are apt to be severely injured by freezing. The thing to try for is to hit the planting date right on the button.

The counsel to plant early and timely applies also to the southern winter-oat territory. It is a good rule to plant winter oats 3 to 4 weeks before the average date of the first killing frost in the northern part of the region. In much of the Cotton Belt winter oats should not be sown later than the last week of October, and not later than early November in the Gulf Coast region.

Harvesting and Preservation

Most of the oats in this country are harvested and threshed by one of three combinations: (1) Cutting with a grain binder, followed by curing in the shock and threshing with a stationary separator; (2) cutting and windrowing with a binder without tying into bundles, followed with a pick-up combine when cured; and (3) combining directly from the standing crop. The preferred practice is gradually shifting from the first to the second and third of these methods. Some of the new varieties, such as those originating from the Victoria x Richland cross, have a distinctly longer seed-dormancy period and therefore will endure more protracted exposure to the weather without sprouting.

Especially in the northeastern and southern states where acreages are relatively small, rains frequent, and the oat straw is utilized as roughage, binding and threshing is the most popular method. The bundles are cured in shocks capped with sheaves to protect the grain. There is no good reason why the farmers down there shouldn't keep right on with this sound practice. In the Corn Belt and the Great Plains Area to the west, combines are becoming more and more popular for both wheat and oats and many farms no longer possess a binder. Most of the wheat in this region is combined and it is easy to adapt machinery and method to oats. Many of the new varieties have such a high degree of standing ability and appear to be so shatter resistant that the crop may be left standing till dead ripe and dry enough to combine directly like wheat. Many farmers speak of this variety of oats as "combine varieties." Seasonal climatic

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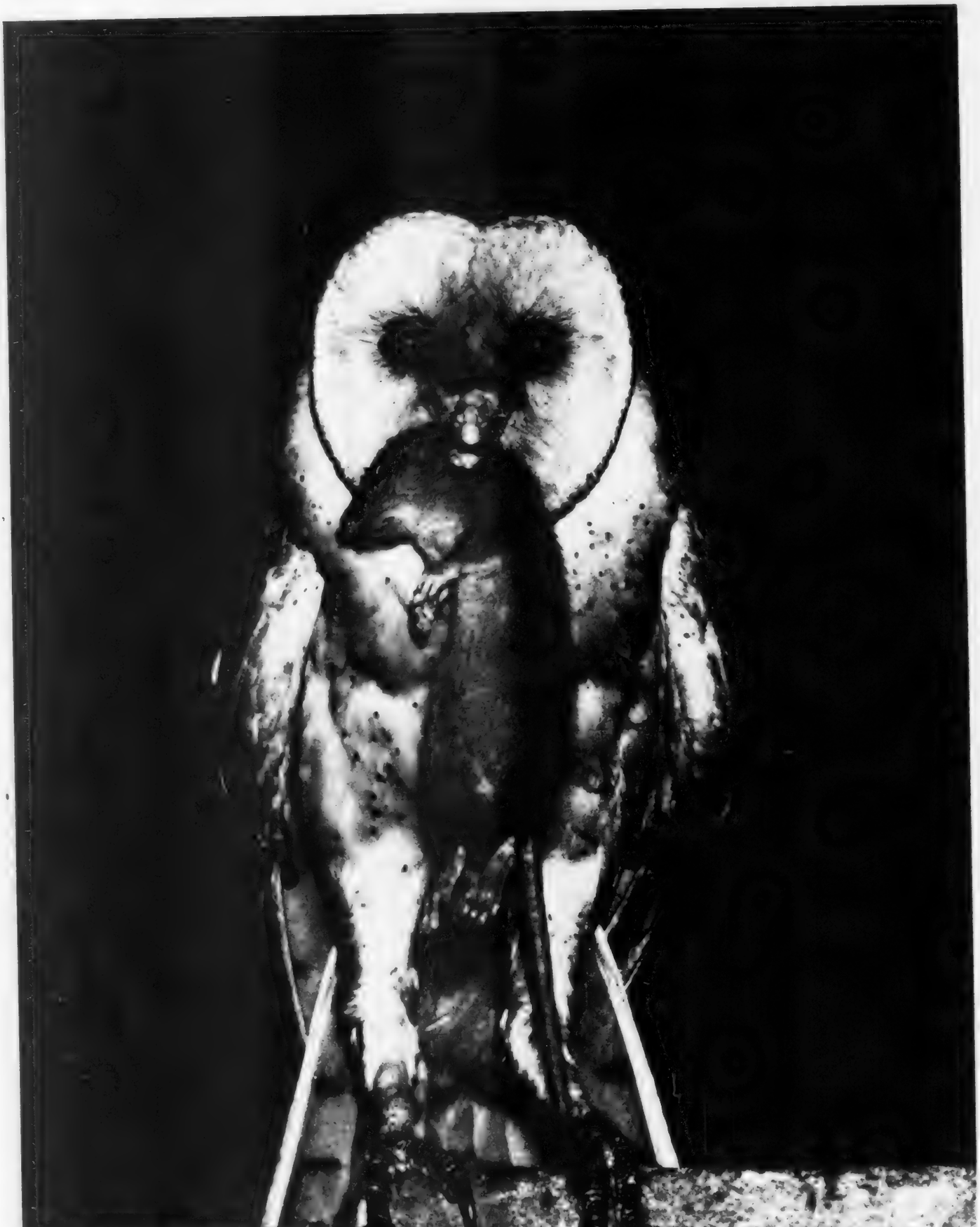

Flying RAT TRAP

by KARL H. MASLOWSKI

THE NEXT TIME you hear a farmer threatening to get out the shotgun to clean "those noisy barn owls" out of a hollow tree or the rafters of his barn ask him if he knows that an owl can work half-time and beat the best tabby cat he ever owned at catching mice. In fact a nestfull of young ones have such ravenous appetites that Ma and Pa have to stay up all night every night to catch the 20 to 30 mice and rats that they must have to keep them quiet.

No one likes rats or mice, and farmers have less reason than anyone else to want them around. They destroy hundreds of millions of dollars worth of crops and property annually. Rats kill young chickens and ducks. They spread dangerous diseases, including the dreaded Rocky Mountain spotted fever and bubonic plague. Mice are as bad or worse, for there are more of them. In nurseries and orchards they girdle trees and spread all kinds of diseases of the barnyard and poultry yard. So it follows that anything that we can do to encourage and protect the birds that kill these trouble-makers is smart business. Pennsylvania, Ohio and Michigan now protect barn owls and as their value is appreciated more fully other states will follow suit.

E. L. Morris of Springdale, Ohio, who operates a large dairy farm and raises much of his own grain, considers the nest of barn owls that live in an old pigeon house in the top of his barn as a valuable asset. To study their habits and hoping to get some pictures of their home life I climbed the rafters of his barn one summer night.

The block of still pale blue sky which I could see through the barn loft window was just beginning to glitter faintly with the first evening stars. It seemed only a moment ago that the sun had been well above the western horizon and a meadowlark had been caroling in a pasture. Now all was still for an instant, and then the night noises began. Cricket frogs started to chatter in a nearby cattle pond, katydids spoke from the soft maples, and from a faraway stubble field I heard a barn owl scream.

The cry made my finger tense on the trigger. Before the muscles in that digit could relax the window frame was spanned by a pair of great white wings. When those wings closed I squeezed the trigger. There was no deafening roar, just a faint click and a blinding flash. For my finger had pressed a camera trigger. My target was the barn owl which I'd heard scream, and which had a family of five young in a deserted pigeon box in the loft where I had kept my vigil. It had alighted on the window sill with prey in its beak destined for the owlets.

The finished photograph gave additional confirmation of a fact I already knew—barn owls are just about the most valuable birds a farmer can have on his property. It showed the angelic looking owl framed in the black of night with a limp, half-grown Norway rat clutched in its mandibles.

One rat, however, is not positive proof of the economic value of a predator like the barn owl. Fortunately the value of this species does not have to depend on this one lone instance. Investigators in more than a dozen states have pried into the dietary habits of barn owls throughout the year and invariably the answers have been the same. Insofar as man's interest is concerned the feeding habits of barn owls are faultless.

These tan and white birds with the freckled undersides, jet black eyes, and monkey-like faces grow to a length of 20 inches. In flight they have a wing-spread of nearly five feet. The principal wing feathers, the primaries, which must be reasonably stiff to support the bird in flight, have soft leading edges, making it possible

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SHOOTING BARN OWLS was once considered good sport by farm boys. Now it is known to be about as profitable as shooting the best mousers among the barn tabbies. To keep a growing brood of owlets happy the old owls have to bring home about twenty rats and mice every night.

"ROBERT BAKEWELL'S RAM LETTING AT DISHLEY", painted by Thomas Weaver in 1810, gives the clue to England's position as the fountain-head for many breeds of purebred cattle and sheep. The appreciation of Bakewell's breeding genius was such that farmers came to his place in Leicestershire from all over the British Isles to bid for a season's use of his fine shearling rams. The one in the picture center brought 1,000 pounds.

Practical Livestock Breeding

By J. F. WALKER

LIKE POLITICAL PARTIES when they grow old there are developing certain distinct cleavages in the stock breeders in this country. Breeding experts tell us there is too little exchange of information and stock between these groups, and for the good of all there should be some changes made.

The first group of breeders is the most numerous. It is composed mostly of farmers whose main interest in their animals is in quick turnover. They put a male and a female of a species together, let nature take its course, and hope for the best. The second group contains the fanciers and show ring breeders; included are such socialites as Doris Duke. They are the idealists of the business. They have developed outstanding animals of types and specifications of the breed standard. Many of these breeders have poured fortunes into importing and selecting animals of certain lines or standards to stock their farms. To come anywhere near a break-even on their operations they must sell to other breeders of the same financial capabilities. Too often the stock from these farms cannot be purchased by breeders who would make the most practical use of it, and improve all livestock.

The third class of breeders is known to the trade as "commercial breeders"; it is made up of those who are breeding animals because it is their main farm business. But their profits are based on production and not on show ring points. These are the men who study consumer demands, market outlets and available feeds, plus the ability of the animal to show a net profit under their operating conditions. This kind of breeder must know what the market wants and how to produce it profitably. A breeder in this group may, for example, be a ranch owner whose income is derived from selling feeding stock,

or in selling female breeding animals to replenish eastern flocks and herds. In this case, he is largely dependent on forage crops for the maintenance of his cattle or sheep. It is absolutely necessary that he keep animals that can profitably produce offspring while subsisting largely on grass and shrubs.

No person can hope to attain any great success in mating livestock unless he first knows what he wants to produce.

Even our wild animals exercise a certain amount of selection in their matings, and naturally follow a fairly definite pattern in breeding. It is the most powerful stag or stallion that rules over his harem; it is the fleetest dog wolf that mates with the fastest of the females, and the supremacy of the male lasts only so long as he can prove it in actual trial.

Survival of the Fittest

In wild life, if weaklings were allowed to mate with weaklings, the species would soon fall prey to its enemies. In breeding livestock, the man who does not seek to continue to make his particular breed more efficient or profitable will lose his trade if he be a pure bred breeder, or if he is operating on a commercial scale he will go broke. Back in the mind of every producer of livestock should run the couplet:

"For what is worth in anything,
As so much money as 'twill bring."

This applies even to animals raised purely for pleasure. The difference between a $1,000 saddle horse and a $100 one is the difference in style, conformation, and ability to perform.

The Spanish Merinos

Early methods of breeding seem to have followed somewhat along the lines that wild animals used in propagating themselves. A typical example may be found in the history of the Merino sheep in Spain. The Spaniards had nothing to do with the development of this breed. It came into Spain when the Moors conquered a portion of that country. They brought sheep that had been bred for centuries for the production of fine wool. When the Moors were driven out of Spain, their flocks were left behind and were promptly seized by the nobility who made little if any effort to improve the breed. These sheep were driven into the mountains early in summer and back to the lowlands in the fall, a trip of about two hundred and fifty miles. A soft-footed animal could not stand up under this hard life; the surviving Merinos were those with hard hoofs. All animals that strayed from the main flock became prey to wild beasts, so Merinos learned to flock together by the elimination of the individualists. Here are two qualities, hard feet and flocking habits, that still are to be found in Merino sheep. Only the sheep who had these two qualities survived.

For over one hundred years after the Spanish Merino type was set, the breed showed little improvement. About 1807, specimens of the breed were imported into the United States, and a little later, were brought in large numbers. In less than fifty years, through skillful breeding, the weight of the fleece was quadrupled, and the carcass increased one half. This is a good example of planned breeding versus natural selection.

For centuries horses were developed for speed at the gallop, and harness races were confined to those of the chariot class at that gait. The introduction of the buggy as a means of conveyance brought about the need of a gait that would carry the vehicle along more smoothly, and the trot or pace did the trick. Animals possessing these gaits were selected and mated to each other and soon, the three minute trotter was replaced by the two-thirty one. For years, this *extreme* two-thirty speed was considered adequate to allow entry into the stud books of the breed. Little attention was paid to conformation or soundness, so long as this speed limit was reached, and the standard bred horse of forty or fifty years ago represented a wide variation of type and conformation.

About this time someone discovered that

A TOP SIRE OR DAM can not be judged by flesh alone. Back of each are many hours of painstaking paper work. Accurate records of production and performance of the ancestors of the animal being considered are a good guide for the buyer.

horses of certain conformation were better adapted to the production of the gaits desired and further, that certain combinations of blood lines were more certain to produce a faster speed. It was not long before the "two-thirty" horse was considered a very slow specimen and one heard of the "two-ten" trotter which today is the "two minute" horse, or better.

Many examples could be cited to show the adaptability of animals to the needs of humanity or to the various climatic or food conditions. It is this adaptability of our various breeds of livestock that has made them so valuable in adding to the comfort and wealth of humanity, and, for the same reason, it is because of it, that in the hands of faddists or inexperienced breeders they may be bred for some particular point with a weakening of the overall characteristics of the breed. Breeding for extremes has wrecked some breeds and ruined the finances of many breeders.

It is regrettable, but true, that many of our "breed improvers" have proven "breed wreckers", so far as profit is concerned, by striving for some fancy point, or overemphasizing some one quality.

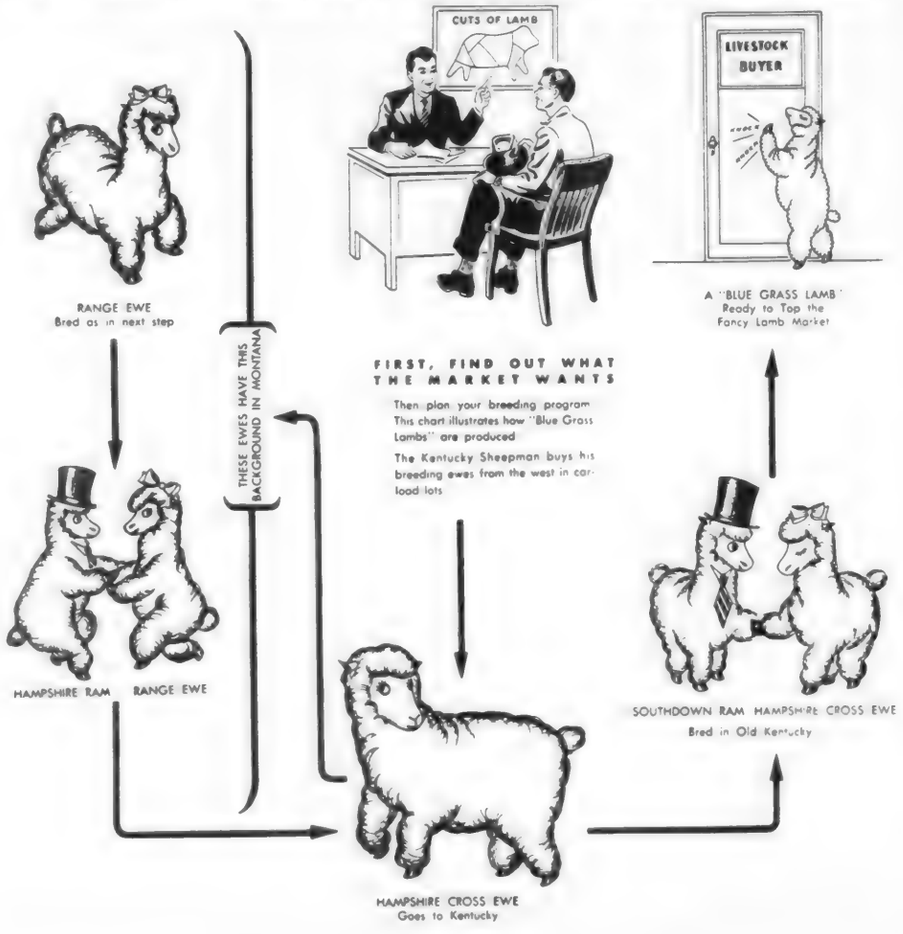
There was a time when breeders wanted a Poland China hog with four white feet, a white tip on the nose and tail and *no other white markings*. No evidence was ever produced that these markings made them more efficient producers of pork or that packers or consumers were willing to pay a premium for these perfect markings in color.

Beauty Is As Beauty Does

Some of our leading breeds of sheep have suffered through misguided effort on the part of breeders to produce a "prettier" animal. The nose and feet must be black or white; there must, or must not, be so much wool on the face or leg; the ears must be so large, and set on the head in a certain manner, and so on.

In contrast to this attention to breed details is the attitude of the final purchaser. The man who buys a chop doesn't know, nor care, what the animal from which it came looked like, or whether it conformed to the breed points, so long as the meat pleases his taste. This year at a dinner given after a cattle show the judge was asked to tell why he paid so little attention to color marking. He told this story: "During the war when the students at Harvard were not selected by the usual standards, a professor was delivering a lecture on Aerodynamics. The lecture had dealt with chords and strains and the subject of flying insects was being considered. 'The bumblebee is a fascinating member of the family, *Bombus,* he announced categorically, 'and by all of the standards we have set up it is impossible for it to fly.' Before he had a chance to continue, a twangy mid-west voice in the back of the room cut in, 'Yep, but he didn't come to Harvard; he don't know it yet.'"

THE FAMILY HISTORY OF "BLUE GRASS LAMBS"


CUTS OF LAMB
LIVESTOCK BUYER
RANGE EWE
Bred as in next step
A "BLUE GRASS LAMB"
Ready to Top the
Fancy Lamb Market
THESE EWES HAVE THIS BACKGROUND IN MONTANA
FIRST, FIND OUT WHAT THE MARKET WANTS
Then plan your breeding program
This chart illustrates how "Blue Grass Lambs" are produced
The Kentucky Sheepman buys his breeding ewes from the west in carload lots
HAMPSHIRE RAM
RANGE EWE
SOUTHDOWN RAM
HAMPSHIRE CROSS EWE
Bred in Old Kentucky
HAMPSHIRE CROSS EWE
Goes to Kentucky

Certain breed associations refuse to accept off-colored animals as eligible for registration regardless of their merit, or they discount color in their shows and sales for no other reason than that it is not popular. A white Shorthorn is discounted in the average sale today on account of color, yet some of the sires that have made the breed great were white bulls. Most breeders will acknowledge that the best feeders are oftentimes white or roan. A white foot on a red Shorthorn is a decided objection. So is a smutty nose. Why? Well, somebody in a show ring did not like it and placed it far down the line, or some breeder said it was undesirable. That started a trend which grew into a show point.

Black Tongue, Yellow Butter

There was a time when Jersey breeders wanted all their cows to have black tongues. Just what particular virtue was indicated in having a black tongue was never satisfactorily explained.

Breeding for profit necessitates a knowledge of the needs or demands of the market to be supplied. It also requires an understanding of the breeds that will not only supply the demand but can adapt themselves to the feeds that are available, or to climatic conditions in the regions involved.

The breeder of purebreds who is concerned about a profitable production must be able to anticipate consumer trends years in advance. The commercial producer can take short cuts to meet changed market requirements by cross breeding or similar practice, but this is denied the purebred breeder.

Jack Spratt Calls the Tune

For years, lard was an essential in cooking. Lard is today competing with various vegetable fats and is no longer used in its former quantities. Hog breeders have discovered a very definite and constant trend on the part of the consumer to turn to bacon and hams in their demands and away from meat carrying excessive amounts of fat. The hog breeder must turn his attention to a hog with deep sides and full hams with light shoulders. He must carry a high percentage of lean meat and a minimum of fat. The hog breeder must feed such rations that will further this kind of development. And, of course, there are feeds that tend to produce lean meat and feeds that produce fat. But the great stand-by of the hog feeder in the United States is corn, and corn is a fat producing ration. It is also a cheap ration for pork or beef production, so the question before the hog feeders is how to meet the market demand and still show a profit. The answer, according to some very practical feeders, is to use more forage crops such as alfalfa or clover, supplemented by high protein foods.

In Minnesota, men concerned with the production of a more profitable type of hog crossed the famous Danish breed.

KENTUCKY SHEEPMEN HAVE A PRACTICAL BREEDING PLAN. This is Henry Besuden of Winchester giving a final touching up to his "Carload of Spring Lambs" entry for the 1946 International Livestock Exposition. For his breeding plan see the chart on page 72. A week later these lambs won the grand championship and sold at the record price of 55 cents a pound. Besuden was the first American winner in this class at the International in 17 years. Canadians have won in recent years.

the Landrace, with the Tamworth. This cross was made with the idea of producing a hog that would carry a maximum amount of lean meat on a deep side and ham, plus the ability to produce large litters and make rapid gains. The cross-breds have been inbred until it is claimed a definite type has been established that is showing equal or superior merit to some older established breeds. (See Farm Quarterly, Autumn, 1946.)

A newer experiment is the crossing of the Yorkshire and Poland China to form Minnesota No. 2 strain. While it is still too early to determine its ability to breed true, it bids fair to rival the No. 1 cross that was first tried.

Purebred Types Change, Too

The procedure in both cases has been through selection of those animals that have best met the particular things sought for, to develop the desired hog. It has been thoroughly demonstrated that equally good results can be obtained through selections within breeds already established. One has only to look back fifty years to discover three distinct types in hog breeding. At that time, the dumpy lard type was common in all breeds. Then came the swing to the extreme size and heavy bone of twenty-five years ago, when breeders boasted of 1,200 pound boars and 1,000 pound sows. More recently we find the lighter boned, trimmer built type, emphasizing the production of greater amounts of lean meat and less lard. This type produces a hog that will go to market at six months of age or less, weighing two hundred to two hundred and fifty pounds and carrying a high percentage of bacon and ham.

However, the purebred breeder always recognizes the fact that any marked structural change is not obtained overnight if it is to be a permanent one. It is not a question of one generation but of many. Neither is it a matter altogether of individual selection and mating, nor the mating of champions to each other. A champion merely reflects one man's opinion. It is the ancestors that largely determine the character of the offspring. It would be a much harder task to develop a low, thick-set individual from an ancestry of tall rangy animals than to secure such a one from ancestry possessing those qualities. The purebred breeder, to be successful, tries to learn all he can of the qualities of the animals that are the background of his herd or flock.

It is questionable whether the mating of extreme types is to be recommended in trying to change one's type. This is, in effect, a modified kind of cross breeding, and the progeny from such matings are apt to lack uniformity in breeding in the succeeding generations. A gradual change is far safer.

A PREPOTENT BULL of proven ancestry can be as profitable an investment for a farmer as any other piece of farm equipment. The variables that can change the picture are, proximity to artificial insemination service, the number of cows to be mated and the possible outlet for the progeny of a fine bull within a reasonable shipping distance.

THE MINNESOTA NO. 1 HOG was one answer to the demand from housewives for "more lean meat". In this case the experimental breeding was done by the University of Minnesota. Tamworth sows were crossed with a Landrace boar to produce the breed.

In considering his markets years ahead the purebred breeder must also figure the time required for a change. Three generations in hog production represent some two years of breeding, in sheep it requires five to six years and in cattle seven to eight, horses still longer. These future markets must be anticipated in ample time to provide seed stock for commercial operators.

There was a day when large cuts of meat were wanted, and 1,600 pound steers were in demand. That day has passed. The modern housewife wants smaller portions and her culinary budget is based on them. To meet this demand, meat animals go to market at around 900 lbs. and yet must show a good dressing percentage of meat to bone. Fifty years ago steers went to market at three to four years of age; hogs at one and a half years and wethers at two or three. Today we are putting three crops of livestock on the market in the time it took to put one on in the old days, and our breeding operations are modified accordingly. This modern market requires an early maturing animal capable of making rapid gains. In beef and lamb, much of this gain is made on the mother's milk. That means she must be a good milker, and must be fed to produce milk.

The Points To Look For

The breeder who wants to produce animals that will show a profit in feed lots will select females with capacity to carry the offspring, and that carry an inheritance for milk production. He should also concern himself with vitality and length of useful production. Research at one of our Experiment Stations on lamb mortality showed that much early mortality came from a certain groups of ewes. These ewes were traced back to one family and this family came from a very noted show ram. His progeny showed the astounding figure of 44% early lamb mortality. Based on type, conformation, number of offspring and show record this ram was a great sire. Based on a record of profitable production, he graded with the poorest scrub.

Another tendency, also inheritable, is that towards sterility. A famous strain of cattle passed practically out of existence because of this inheritance. This was the Dutchess family of Shorthorns of Thomas Bates. Considered so good that any admixture of outside blood would taint it, the strain was inbred until this inherited sterility became so pronounced that Dutchess Cattle are no longer to be found.

Still another inherited factor is fecundity. Some cows raise a calf every year; some will average one every eighteen months or even two years. Some families of hogs within a breed will have four to six pigs, others eight to ten.

Recently a beef cattle breeder remarked, "I have a cow that produces very little milk. It seems to run in her family as

(Continued on page 137)

The Water Mill

To those of us who grew up on the farm, The Water Wheel and the six scenes on the following pages, will recall a life that was busy and demanding, but satisfying in its accomplishments. Those who have not had the privilege of farm life think of such scenes as the very essence of contentment and the happy life. These are the things people remember, the things they spin yarns about.

One of the first business enterprises in a pioneer community was the flour mill, for bread was then, as now, the staff of life and the making of flour a difficult home project. Settlers often pooled their spare money and contributed their time to help the miller construct the mill race and the mill. Sometimes the mill stones were hauled across the mountains to the new country. The wheel and the timbers of the mill were hewed from the forest trees. The machinery was simple; the wheat was caught between an upper and nether stone which were turned by power from the wheel. The miller took as "toll" a portion of each bushel of of wheat brought for processing. While water driven mills have almost vanished from the American scene, they are common in European countries. The one pictured above is still in operation at South Sudbury, Massachusetts.

Brook Fishing

If tired business men could turn back the clock the banks of all the little brooks of the world would be crowded with small boys and their dogs. Of all the days of our youth, the most delightful were those we spent with a dog, a fish hook, and a can of worms along the brook that skirted the farm.

Week days were taken up with school and chores, but Saturday was our own and from early spring until late fall we haunted its banks. There was a can of worms under the back porch, the by-product of a job of spading we had done in the kitchen garden.

Calling the dog, we climbed the gate to the pasture and walked down the cow path across the fields to the brook. It was quiet and restful there; dragon flies buzzed about the pools and a rare leaf floated down to the water from the overhanging trees. At a bend a weeping willow leaned far out over the water. Here a deep pool had been washed out and here the biggest shiners and sunfish lay. While the dog investigated the latest messages in the skunk and groundhog holes along the bank, we cut a willow pole tied on the line, using a ketchup bottle cork for a bobber.

All the long afternoon, as the shadows lengthened across the pole, we sat and watched the bobber, hoping for the big one that we never caught. Chore time came too soon and we reluctantly crossed the meadow again, carrying a half dozen small fry strung on a piece of packing string. In the cool of the evening an indulgent mother served them, crisp and brown.

The Church Supper

The church mouse did not achieve his legendary reputation for leanness from mere accident. He was no doubt the inhabitant of a country church in the days of our grandfathers when he sometimes ran a poor second to the minister.

The underpaid, and often unpaid, ministers to the souls of our rural forefathers were often reduced to a polite form of begging and few of their families rose above genteel undernourishment. Their parishioners had no illusion about how much food and clothing the $80 or $100 a year, an average salary, would buy. The customary supplement to this starvation wage was the church social, given as a benefit for the preacher and his family.

Church socials were held on the lawn of the church on summer evenings. Members of the church donated cake, platters of fried chicken, canned preserves, fruit, and other delicacies of the season which were served at plank tables laid on wooden saw horses. Food was served family style and the usual cost of a church social meal was 25 cents for all you could eat. Ten cents was charged for children who usually ate twice as much as their elders. Society leaders of the community presided at the cake table where the work was easy and where they got a chance to compare the baking skill of their neighbors. The preacher's wife and the lesser members of the congregation washed dishes and served the hot food from a brick stove or kerosene range set up for the evening under a canvas. It was a gala time for the children of the community who could play on this rare occasion when neither Sunday school or public school cast a shadow on their spirits.

The swain who squired a girl at a church social dinner was a marked man for this was understood by all as an open and public declaration of serious intentions. There was no trifling with tradition on this score.

The minister's family was richer by $25 or $50, everybody had a good time and every housewife gathered up enough leftovers to feed her family the next day, a phenomenon of the fish and loaves sort that was very mysterious and wonderful.

The Rag Carpet

On long winter evenings and on rainy days when a few minutes could be snatched from the work-full day, the women of the household sewed strips of fabric end to end for weaving into rag carpet. No old clothing, wool, cotton or linen, was ever thrown away. It was stuffed into the handy rag bag and later torn or cut into long strips, which were sewed together, and rolled into balls. It was taken to a carpet maker whose loom wove a simple criss-cross pattern. The strips, as they came from the loom were about three feet wide and as long as the qauntity of rags permitted. The strips were laid on the floor and tacked down. Choice, brightly colored rags from Sunday dresses were often made into throw rugs which was very special and was placed in the center of the parlor floor, chiefly for show. A half dozen large balls of rags made a yard of carpet. When the carpet wore out it was thrown on the back porch as a foot wiper, or was used as a bed for the dog or the orphan lamb in the spring.

The carpet weaving usually fell to grandma, but grandpa had his place too. To him fell the job of taking care of the young stock around the place. He was well-versed in the lore of potions and herb remedies for young calves and lambs and had a way of getting them through the first difficult days. Grandpa would use a blackberry juice potion to cure scours in a calf.

The Threshing Dinner

One of the great social events of the farmer's year was threshing time. Communal life flourished in the early days and harvest time was its flowering. Starting in late June or early July, itinerant threshing outfits made their way from farm to farm for one and two day stands until the fields of a whole community were bare of their wheat and oat shocks, and the golden grain had been stored in bulging granaries. During threshing time all the farmers in a district pooled their teams and their labor to haul the sheaves to the thresher and the grain to the bins.

It was in the kitchen of the farmhouse, however, that threshing day reached a dramatic climax. The sweat and toil of the fields were off-stage, for in the kitchen and the long dining room a much more delightful event was shaping itself—the threshing dinner. Riding with their husbands on the big flat-top wagons in the morning, the women of the neighborhood bustled into the kitchen and started operations before the dew was off the wheat shocks. The wood stove glowed, and delicious aromas rose from the pots and pans; there was a din of female voices, all talking at once about babies, quilts, relatives and preserving.

As noon approached the din increased. The table began to groan under platters of fried chicken, country smoked sausage, sugar cured ham, sparkling preserves, mountains of mashed potatoes, and quarts of brown gravy. Pitchers of cold milk were brought up from the spring house. A row of golden brown apple pies were cooling on a bench under the shady back porch.

The dinner bell rang. In the fields the steam thresher gave a tired chug and stopped, horses neighed, and men climbed down from the wagons. Soon there was the clanging of the wash basins, the swish of water, and the bass of masculine voices. The roller towel lost its virginal whiteness.

The tables were filled. Behind each man was a woman of his own household, filling his plate with the choicest food. There was the din of eating tools and dishes, but little conversation. A few speculated on the weather, on how much grain yet remained in the field. All ate ravenously, gulping mouthfuls of hot coffee. Chewing on a last mouthful they rose, wiping their mouths with the back of their hands; they rested a few minutes in the shade of the pear tree by the well-sweep, went back to the fields. Harvest time permitted few of the amenities. Another long half day remained. The women too, had work. The stacks of dishes to wash, an evening meal to prepare. But the climax of the day, the noon hour, was past; it would be very quiet in the farmhouses that night and there would be few lights showing after darkness had fallen. Harvest time was hard work.

The Root Cellar

Just before the first frost the men of the farm pulled the turnips and cabbage, dug the potatoes and other vegetables and carried them into the root cellar. The root cellar was built partly above, partly beneath ground. It was walled with brick or stone and earth was heaped around it. A solid roof, sometimes also made of earth, protected the contents from the frost. The proper humidity and temperature was maintained for the perfect preservation of roots until late in the spring. The mixed odors of apples, wet earth, potatoes and the other fragrant roots were inviting and told an eloquent story of the fruitfulness of the rich earth. There were bins and shelves in the root cellar; the shelves usually held cans of fruits and vegetables and jars of preserves if these were not stored in the cellar beneath the house. Today root cellars are rare. Modern transportation brings an abundance of fresh fruits and vegetables to the crossroads grocery and much that was formerly stored as it came from the ground and tree is now processed for canning. Quick freeze units have also had a part in outmoding the root cellar, once indispensable on every farm.

COME MIDSUMMER, stock begins to shun the sere and yellowed grasses of barren hillsides. Alfalfa and brome can put the steep acres back into the profit column, but it takes some cash, some time, and a well-planned campaign.

Alfalfa On The Hilltops

by GEORGE E. LAYCOCK

WEATHER, the markets and labor troubles plague the farmer in their season, but a hillside field is a headache that stays with him the year 'round. Generally in pasture, and poor pasture it is even in the spring, the field is usually written off as far as income is concerned.

How often the farmer leans against the fence and sees that bare hillside of briars and poverty grass as he would like to see it—covered with lush pasture.

He thinks of alfalfa, the queen of the forage crops, and how those unprofitable acres could pay their way if only the queen were not so temperamental and so prejudiced in favor of rich soils and level fields.

That alfalfa will grow only in rich soils on flat fields is only a half truth. Recently farmers have found a way to circumvent nature, by slipping in a nurse crop or two and varying the usual method of cultivating for a seedbed, that has not only taken hillsides out of the red as pastures, but has returned the additional profit of a hay crop.

A trash-mulch seedbed and a mixture of alfalfa, brome and ladino are now producing fine pastures and good hay on hillsides as steep as twenty per cent. Because a hillside is generally pretty thin, some money will have to be spent for the initial outlay to get the thin soil in condition, but the dividends will be large and the income will soon liquidate the original expense.

Farmers in the rougher counties in the mid-west have learned how to make alfalfa thrive on even the poorest soils when these soils are given the proper treatment. One farmer who is glad that he learned to grow alfalfa on a hillside is Jud Martt, of Muskingum County, Ohio.

Martt bought a hill farm because he lacked top soil. This worried him, for he grew up in the hills. He knew his farm knew he couldn't graze cattle on a bare hillside even if it is beautiful. The neighbors all said, "Jud bought a lemon." After he had walked over the whole farm he was inclined to agree.

"I was sick of the place," he said. "If I could have backed out then I would have." Since it was a little late to back out, he tackled the immediate problem of getting pasture for his cows. The first and probably the wisest thing he did was call on an acquaintance of his. Dr. Harold L. Borst, supervisor of the Soil Conservation Experiment Farm near Zanesville, Ohio.

He asked him to come out and look at the farm.

Dr. Borst came up with a solution to the problem. When Martt asked him how he could get enough pasture to keep his cows alive, the soil expert told him how to plant alfalfa, ladino clover and grasses.

Martt was willing to try the plan. He knew that as it was, his farm produced hardly enough forage to graze a goat. That spring he planted four acres to a mixture of alfalfa, bromegrass, and ladino clover. The next summer he harvested from that field two and one half tons of excellent hay per acre. He also pastured it from the middle of June to the middle of September. It had paid for its initial cost and would continue to produce for another four or five years.

The method used by Judson Martt was developed by Dr. Borst at the experimental farm. It wasn't a program planned to fit only Martt's farm. It can be put to farmers who are still nursing visions of work on nearly any hill pasture. Those hillside meadows can use this method to make their visions materialize.

How to Seed a Hillside

Those who doubt that this can be done may send up a trial balloon, planting an acre or two as a convincer. This acre may be on any hillside, on any farm in the middle west. It can be an acre of that steep pasture where your stock grazes on broomsedge and briars. Any acre will do if machinery will stick to the side of it, and the gullies aren't big enough to swallow a team or tractor. If it meets these requirements and is well drained, it will grow alfalfa. Here are the steps to follow:

Lime

One thing that you must furnish a field that is to grow alfalfa is plenty of lime. Neglecting this step is a sure way to plant alfalfa and reap poverty grass. The earlier you apply lime before seeding, the better the results. Even a year before isn't too soon, but any time until the day of seeding will do.

A CULTIPACKER behind the drill presses the seed into the ground and packs the soil about it. Brome seed, being chaffy, needs this. Keep the cultipacker on the contour.

Have the soil tested to learn definitely the amount of lime you should apply. Most of the fields where the soil is poor will need three tons of finely ground stone per acre. The theory that no land needs more than two tons of lime to the acre doesn't work out in practice. Give each field what its pH calls for. If tests show more than one ton per acre is required, apply one half before plowing, the remainder on the furrow before disking.

Your two-way disk can do the job if weighted down with about 500 extra pounds. A disk plow, being heavier, is better fitted for the job for your disks may have trouble digesting briars and poverty grass. The number of times that you must go over a field will be determined by the vegetation on it. You will have to disk it until the weeds and grass are chopped into a good mulch. Where the vegetation is thin, a double disk can do this in two trips. Don't worry about not working up a deep seedbed. Shallow ones are better.

Tractor power is better than horses for this job. If the going is rough, a tractor will be a necessity. As soon as the ground gets dry enough in the spring is the best season to work up a trash mulch seedbed. Disk on the contour. The soil and power you save will be your reward.

A trash mulch seedbed is important to the farmers in more ways than one. The most striking reason is that a blanket of chopped vegetation on a field will save the soil. The trash becomes a sponge. That lets the rain run into the hills rather than down their sides. It holds soil on the slopes until forage time can bind it with their roots and protect it with their canopy of leaves and stalks. A plowed seedbed loses more water by evaporation than does a mulch covered one, which will last

IN ONE OPERATION this hillside is being taken out of the red. Two disks chop the mulch and prepare a firm, shallow seedbed; the drill sows the alfalfa and brome and scatters the fertilizer. The hillside has been limed the year before.

WHEN A HILLSIDE produces a hay crop such as this, and can then be pastured until the snow flies, a few steep slopes on your farm need no longer be like poor relatives, burdens bestowed by an unkind fate. After Sept. 15, rest the field for five weeks.

longer in dry weather. If you can find time, culti-pack the field just before you plant.

Fertilize

Alfalfa doesn't need expensive nitrogen fertilizers after it is well established and begins to fix its own nitrogen out of the air. On poor hillside soils, however, it pays to apply 5-10-10 for earlier production and a more even stand. Even alfalfa needs some nitrogen to start it off. What it does require, in addition to lime, is plenty of potash and phosphate. It mines the soil of these, especially potash, which must be supplied to balance the nitrogen.

The fertilizer to apply each year as a top dressing is an 0-14-7 or 0-12-12. At the start every acre should receive 400 pounds and preferably 500 pounds. Drill the fertilizer at the time of seeding, or before.

Seed

Both farmers and research men have learned that the best meadow for a hillside is a mixture of grasses and legumes. A mixture that will work out almost everywhere is seven to ten pounds of alfalfa, ten pounds of smooth bromegrass, and a pound of ladino per acre. The bromegrass is mean to handle and the farmer who prefers not to use it can substitute six pounds of timothy.

There are good reasons for planting a mixed meadow. While straight alfalfa might grow and prosper, grass teamed with it will give bigger yields. It will help elbow weeds from the field, control erosion, and produce a cleaner crop by supporting it above the ground.

Inoculate

Now you need only to inoculate your legume seed and you are ready to plant. The preparation used in inoculating the seed can be bought at seed stores and the directions are on the container. It is sold under various trade names.

The seed mixture can be broadcast from any hand drill. If you have a grass seed attachment for your drain drill, this too will do the job, and the fertilizer can be drilled on the same trip if it hadn't already been applied. Adjust the drill so the seed falls behind the disks.

After you have sown the seed press it into the ground with a cultipacker. As additional insurance against erosion, keep the cultipacker on the contour.

Clip

When your young meadow pushes through the ground weeds will probably push through with it. You have fertilized those too, and nature plays no favorites. Unless they are clipped or pastured down they can give alfalfa a lot of competition. One or two clippings the first year will keep them from choking the meadow. Don't let weeds get higher than eight or ten inches, and have them clipped by the middle of September. This leaves alfalfa time to build up strength against winter weather.

The Harvest

That meadow may look mighty fine if everything has been done just right and the season has been kind. Some farmers have taken a cutting of hay from their fields the first year. The alfalfa stands a better chance when the first year growth is allowed to stand. At any rate, don't cut hay after the 15th of September; let the alfalfa store strength for cold weather resistance.

The second summer is when you reap the harvest. This is the year it will probably clear up its debt, as well as any doubt that lingered in your mind.

A common, and wise practice, is to take the first part of the summer growth off as

PLANTING ON THE CONTOUR is an insurance policy against erosion. A crop of brome and alfalfa hay was taken from this field in early summer; it was then pastured until mid-September, given five weeks rest, and then pastured until winter.

hay. Let the field rest for a couple of weeks, then turn in the stock.

The longer your meadow lives and produces the more you are going to make on your investment. Watch the condition of the pasture and rotate the grazing on time. From time to time, as need appears, feed it some fertilizer. These fields can't be safely grazed from the middle of September for about five or six weeks, any more than they can be cut during that time. After alfalfa has passed through its period of winter food storage it can be pastured again in November.

This plan of hillside pasture management leaves an unfilled need for early spring and late fall pasture. The best answer to this is a field of permanent blue grass pasture. Blue grass reaches its best growth during May and June when you are probably mowing the first cutting of hay from the alfalfa field. Then during the hot summer months blue grass grows lazy and lies almost dormant, while alfalfa is at its best. Blue grass comes to the rescue again in the late fall.

Small Scale First

This method of meadow building should begin on a small scale so the farmer can learn to fit to his own land and needs. Most farmers who have been successful with trash mulch meadows kept their first fields down to ten acres or less, experimenting with different grass and legume mixtures and technique. It's sometimes difficult to swallow a bright new method at one gulp.

Failure Possible

Few new argicultural methods are without an occasional miscarriage. This one is no exception, but it is nearly so. Of seventy-two trash mulch seedings recorded in eleven Ohio counties, only four failed. Other states report similar percentages.

Leland McCoy, who operates a dairy farm near Coshocton, Ohio, failed with his first hillside meadow. "We had the Soil Conservation Service men in several times," he said, "and learned that the seed wasn't of very high quality. The summer was dry that year, too, and that could have been the cause."

Most failures come from poorly prepared seedbeds, skimping on fertilizer, lack of lime, planting too deeply, poor inoculation of seed, or over-grazing the first season. When directions are followed closely, the chances of failing are slim.

One of the prime reasons of failure in a program such as is called for in getting a hillside in pasture is that farmers insist on acting like human beings. Nature never deviates from her own laws; man cheats on the corners, gets lazy or indifferent, is subject to his own whims and even may be influenced by the condition of his liver. He sees an outcropping of limestone on his field and decides that he doesn't need any lime; he has a little fertilizer left over from his wheat, and decides that while it isn't what the book called for it will do in a pinch and save him a few cents. He's tired and it's Saturday afternoon, so he'll knock off and cross-disk Monday. But on Monday he decides to plant instead and gets a poor stand. If that hillside is to feed cows and produce a hay crop there can be no compromise with the rules.

COST TO SEED AN ACRE

Seed	Amount	Cost
Alfalfa	7-10 lbs.	$5.00
Brome	10 lbs.	2.00
Ladino	1 lb.	2.25
Fertilizer	500 lbs.	7.50
Lime	3 tons	9.00
Total		$25.75
Cost per year (if in meadow four years		$6.45

TWO FIELDS in North Carolina. One has been put into permanent pasture; the other is going to be.

IT'S TIME TO SPREAD PHOSPHATE!

THE news item that ran in a North Carolina county newspaper last summer reporting that, "Calhoun Winget of near here had an unfortunate accident last Monday when one of his milk cows fell out of his clover field in front of an Ashville bound truck and was killed," gave news of the immediate economic calamity that had hit Winget. The long range outlook was of a more cheerful nature, however.

The fact that cows were in hillside clover fields which might formerly have been planted to corn by the shotgun seeding method indicates that the pasture programs are catching on with farmers in the mountains.

Phosphate and liming programs in the mountain states have helped both the land on the slopes and the flat ground as well. Since the corn yields were better on the flat ground farmers were able to feed their stock without plowing up the hillsides. When the hillsides are put into pasture and treated with phosphate and lime they make a comeback and the old gullies and washes slowly are cured by the healing grasses.

The adjoining fields shown in the photograph above are a typical example of the work being done in the Brush Creek area near Marshall, N. C., where the farmers are demonstrating to themselves the value of phosphate and lime. Old residents say these fields were both cleared in the '90's. By 1930 the gullies were so deep they would swallow a ploughman, his horse and plow at one gulp. So they weren't ploughed any more.

In 1932 the land to the left of the fence was sold at a foreclosure sale to a man named English. By 1939 he was in a position to start the conversion of the 10-acre field from a liability into an asset. The first step was to reduce the soil acidity. Lime before a phosphate application is particularly important in clay soils which often "lock up" 50 to 80% of the phosphate applied to them. The problem is to make the phosphate available to the plants. This is best done at a pH of 6.5 or only slightly under the neutral of pH 7.0.

In the summer a ton of limestone was applied per acre and the gullies were plowed in. During the fall of 1939 the field was sown to wheat and early in the spring of 1940 the wheat was top-dressed with 1800 pounds per acre of triple superphosphate (47%). A meadow mixture of 10 pounds of red clover, 14 of orchard grass and 12 of Korean Lespedeza per acre was sown. This three-way seeding got

Why do the hungry ask first for bread?

When famine strikes in Europe why does a humble North Dakota grain elevator suddenly become a tower of hope to millions of men, women and children?

Why does that slice of bread on your dinner plate (which you might casually share with the birds) symbolize life itself to so many people?

Few know the real answers . . .

• Bread is the main-stay in the diet of a large share of the world's population. It is one of the least expensive basic foods. It is convenient to use. It tastes good. It's easy to digest. And it generously supplies the most immediate need of your body—food energy.

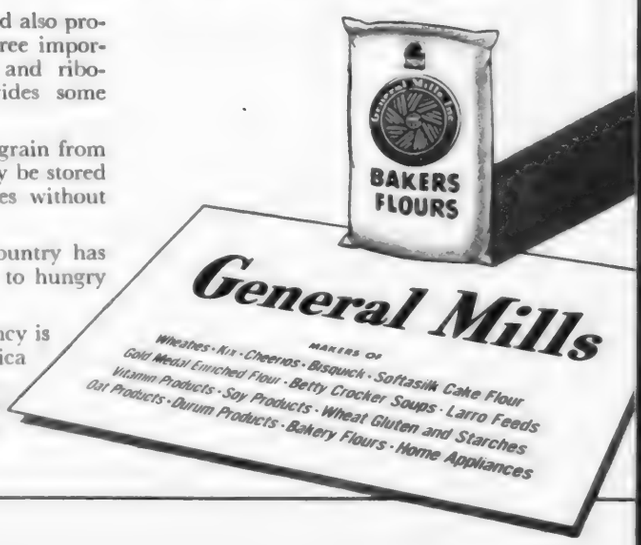
• Because bread combines energy-producing carbohydrates with muscle-building protein, it quickly satisfies hunger, and prevents early recurrence of hunger pangs.

• In its modern, enriched form, bread also provides *highly important* amounts of three important B-vitamins — thiamine, niacin and riboflavin — and iron. Bread also provides some phosphorus and calcium.

• On the practical side, wheat, the grain from which most bread is made, may safely be stored for years and shipped long distances without danger of spoiling.

These are the reasons why our country has been sending all the wheat it could to hungry lands across the seas.

Now that the worst of the emergency is over, the millers and bakers of America have once again been able to turn their attention home—are once again giving you the best loaf of bread in all the world.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SPREADING PHOSPHATE is the farmer's own spring track meet. The race is between the plants and the clay particles in the soil, to see which gets the phosphate first. Clay has the annoying habit of fixing, or locking up, soluble phosphates into forms which are unavailable to plants. The farmer's problem, as the starter in the race, is to give all possible breaks to the plants. Dr. George Scarseth, one of the country's outstanding soil scientists, gives these recommendations: "Acid soils should be reduced to pH 6.5 by adequate liming. Phosphate fertilizer applications should be made yearly, instead of in large, infrequent doses; usually the best method is to apply it in narrow bands in the soil at the side of the seed."

English off to a good start toward a stand of his meadow grasses the first year, although the wheat crop was nothing to write home about. In 1943 the field was treated with 1000 pounds per acre of 20% phosphate obtained as a grant-in-aid for soil conservation from the AAA. Then in 1944 the triple super-phosphate was again spread at the rate of 1800 pounds per acre. In the spring of 1946, 1½ tons of lime was applied per acre. The 23 pounds per acre per year of phosphate P_2O_5 with proper lime, that has been applied on the field over the past 8 years is the recommendation of the North Carolina Experiment Station for this locality.

Before the 10 acres were treated with phosphate and lime only plants able to live on poor soils, low in phosphate, could keep alive. There was a little lespedeza and orchard grass but mostly broom sedge, sassafras and running briars. About one-half of the field was bare. After three years there was a good and nutritious sod which blanketed the whole hillside. In 1946 it was as green and rich as the photograph shows.

Something is happening on the other side of the fence, too. Otis Davis, the owner, neglected the land because there wasn't any money available to restore it.

In 1945 English gave Davis a straw pile, which was spread in the gullies; you can see it if you look closely. Then in the spring of 1946, with the help of Assistant County Agent John Walker, Davis started a program like the one carried out on the adjoining field belonging to English. There is no green carpet shown in the picture, but it is on the way.

Brush Creek farmers are growing alfalfa, clover and lespedeza hay now on land that wouldn't support a goat a few years back. A few men who were willing to gamble their time, seed and fertilizer started the trend.

TVA has been interested in these pasture plans with a longer view than just a better agricultural return. It also includes protection of the watershed of the Tennessee River. Green cover checks erosion and the accumulation of silt in the rivers. The run-off of heavy rains is slowed down so that more water gets to the plant roots.

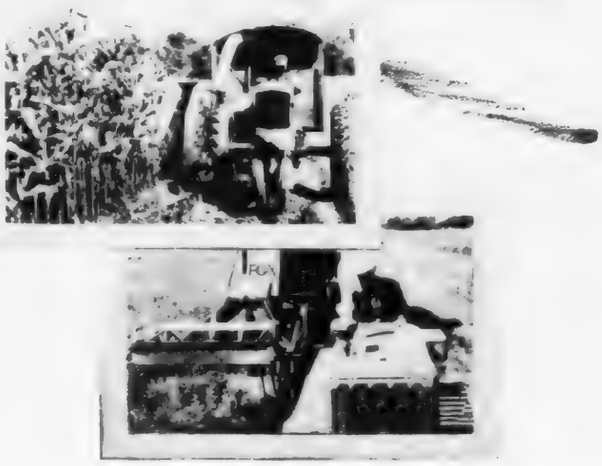
Any phosphate-short land can be restored to productivity with a program designed for the soil types and slopes of the locality. The recommendations and program can be set up by any county agent, or Soil Conservation Service representative.

The Real Way
TO PUT UP SILAGE & HAY

THE FOX Way is the Real Way to put up silage and hay.

The FOX Pick-Up Hay Chopper, together with the Mower Bar, Corn Harvester Attachments and Crop Blower, is now being used by successful farmers all over the United States, to do the two toughest jobs of farming—Silo Filling and Haying.

The FOX Forage Harvester is definitely out of the experimental stage. It has been in successful use for over ten years and has given trouble-free service with all types of hay and silage crops.



The FOX *Way...*

- you can pick up, chop and load, ready for the mow or stack, 2 tons of dry hay in 12 minutes.
- you can mow, chop and load, in one operation, over 200 tons of grass silage a day.
- you can cut corn of any height, chop it into silage and load it into wagons, ready for the silo, all in one operation.

The FOX

Usually pays for itself in a short time, and unlike machines built down to a price, gives years of trouble-free service.

It is built by the Pioneers of Modern Forage Harvesting.

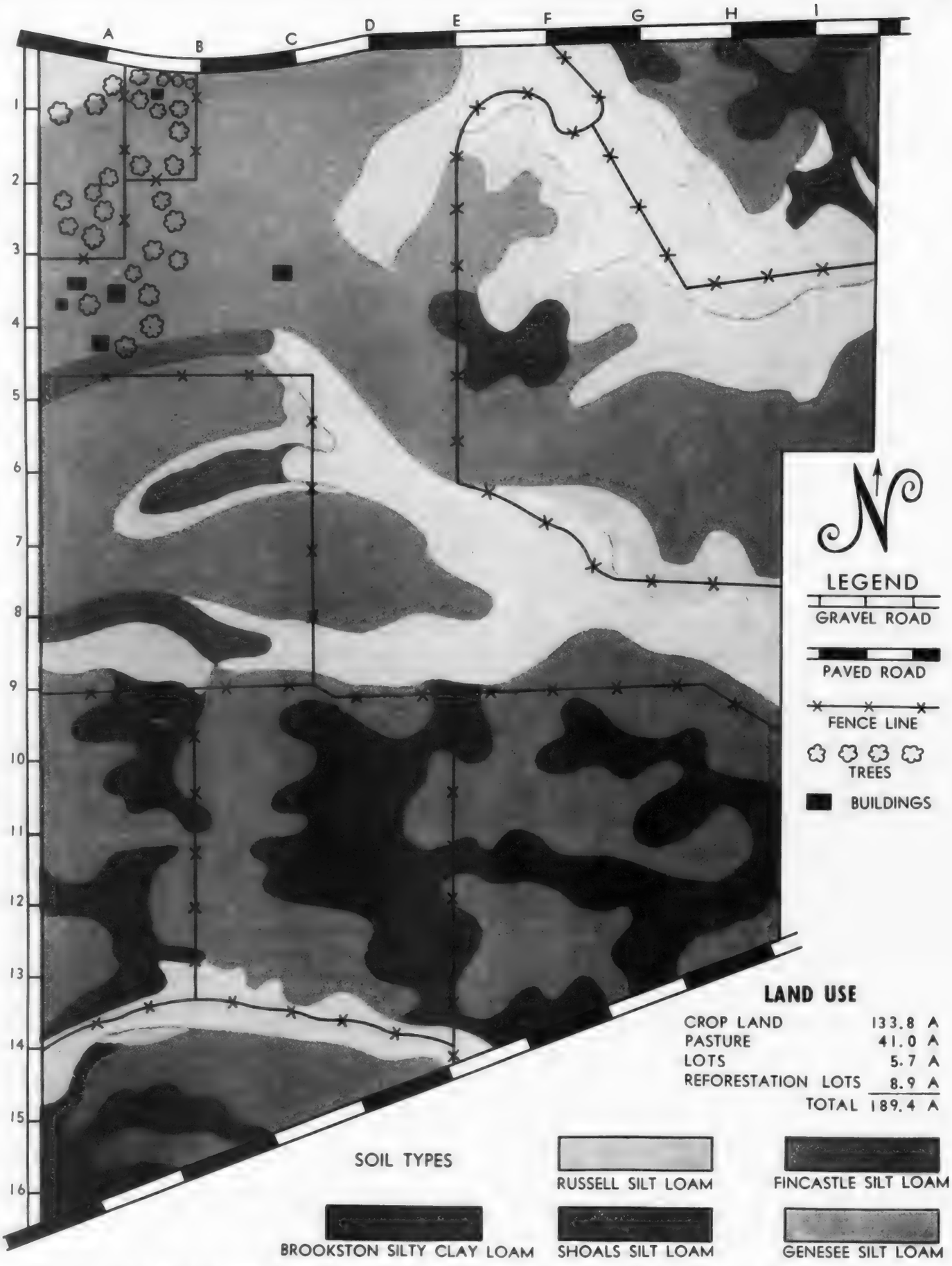
R. G. Krueger
Secretary

FOX RIVER TRACTOR COMPANY

Pioneers of Modern Forage Harvesting

N. Rankin Street

APPLETON FOX WISCONSIN



THIS IS THE SOIL TYPE MAP for the Five Star Farm, the soils as man found them in this gently rolling section of Putnam County, Indiana. Ranging from the black, deep corn land of the Brookston Silty Clay Loam down the line to the wet, low Genesee Silt Loam, it is all capable of good production in intelligent hands. Pages 94 and 95 show the five year program worked out by the farm analyst to fit these soils.

Five Star Farm

A Farm Analyst Takes an Indiana Farm in Hand and Lays Out a Profitable, Long Term Soil Building Plan for the Owner

"WHEN you look through a farm operation plan laid out by an expert like CM Long you have the feeling that it is so logical and direct an approach to profitable farming you should have thought of it yourself, long ago," said Mrs. Dorothy Neff DeVaney as she thumbed through the charts, tables and facts contained in a fat brief case stamped "Five Star Farm."

A series of unexpected events left her suddenly marooned on the rough, partially cleared farm in Putnam County, Indiana six years ago. An accumulation of problems forced her to turn to her friend, Fred O'Hair, for help and advice. He is the President of the Central National Bank, Greencastle, Indiana. She walked into his office with a fistful of debts, a $200 balance in her checking account, a mortgage on 189 acres of partially developed land and the increasing financial demands of raising and educating two children. O'Hair took time to listen and talk over her problems, although a director's meeting was scheduled.

Fred O'Hair is no ordinary country banker; he believes that prosperity for the farmer and the city man are inseparable. To back up his beliefs his bank has sponsored field days, educational meetings and even airplane rides to get the farmers to look at their field lay-outs and erosion problems.

Fred O'Hair did not hesitate to supply Mrs. DeVaney with the money she needed to pay off her immediate bills and to refinance her farm machinery. He added this suggestion: "We would like you to employ a farm analyst, or a farm management service and stay with their counsel." This is a new idea in banking, fathered largely by Chester Davis of the 8th Reserve Federal District Bank. He classes O'Hair as one of the most progressive bankers in the neighboring 7th Federal Reserve District.

Hiring a farm analyst doesn't appeal to some people, but Mrs. DeVaney's experience made her ripe for the idea. She was on a rising market; all of her neighbors were making money. But in the back of her mind she was worried. The fertility of her farm wasn't being improved.

Then one May morning it happened.

The Burned Lamb

"I was driving the tractor through the east pasture to start plowing the corn field beyond," recalled Mrs. DeVaney, with a toss of her head to indicate the general direction. "The crick was swollen and the cross-over was just ahead. I looked twice to make sure that I had the right place. Instead of the banks being 12 feet apart they were 20. There had been some cat-tails and water grass growing on the banks, now there was only the sooty black remains of a grass fire. Then I remembered the hired man having told me that

THE PEOPLE who will make the five year program tick. Mrs. Dorothy Neff DeVaney, the owner-operator who has the job of translating it from paper into action; CM Long, the farm analyst who developed it; Fred O'Hair, the banker who backed it with cash.

he had burned a dead lamb on the crick bank.

"There must have been at least 20 tons of soil gone from that unprotected bend. I forgot all about the plowing and headed the tractor down the bank. The farther I went the worse it looked. There were washes and slides starting all along the bank. Some had come from cattle paths, some had developed because there wasn't any grass left.

"Ground that I thought firmly anchored was slipping into the creek and getting away from me. I was taking the fertility out of the soil and wasn't making more than a modest living doing it. That tractor seat was a firm support and it felt good, but even Harry Ferguson and his hydraulic lift couldn't have raised the load of gloom that settled down over me."

Love That Soap

"I thought back. The reason that I had bought this place was that I liked the life on a farm and I wanted my children out of the city. Farming made you feel that you were doing something that mattered. Working in the newspaper business had paid well, four or five times what we had made off the farm in its best year. But you would work yourself into a dither meeting a deadline on an advertisement. Your client gave it a hasty initial in the corner; it ran in a good position in the women's section of the Sunday paper; you patted yourself on the back. Then down in the 8-point type under the picture you saw the sentence that made a bead of cold sweat ooze out on your lip. How in the hell did that word slip in? 'The perfume of tender, romantic memories . . . fresh as young beds.' BEDS! It should be *buds*.

"Sure enough, at nine the next morning the phone would ring. It's Mr. Lemon. He doesn't want to pay for the ad. It made him the laughing stock of the town.

"That's what *he* said, but all over town women were wrapping up the left over chicken bones and coffee grounds in the women's section of the Sunday paper. They thought less than nothing of Mr. Lemon, his ad, or his beds."

Settling back in her chair, Mrs. DeVaney went on, "The Five Star Final, that is any newspaperman's final edition, and the Five Star Farm was to be my final way of living and making a living for the rest of my life.

"So I decided to spend the money to have my farm analyzed, field by field, and have a complete farm plan worked out. Mr. O'Hair recommended CM Long and I called him and asked him to come down. From there on it's a story of how he went about making this farm a going concern," concluded Mrs. DeVaney.

The Long Plan

Long is a tall, massive, sixtyish Missourian. He has the rippling enthusiasm of a man who is doing the job he likes above everything else in life. A one-time county agent he has spent 50 years in farming. He taught in the Agricultural College at Purdue, and he now lives in West Lafayette, Indiana.

The first question that Long asks when he gets down to cases on a farm plan is, "I suppose you want to build up your soil?" He has yet to have the first man answer "No" to this question. Of course, this is a planted question, for later when certain soil-building practices are questioned by the operator, Long's stock answer is simply to refer to the earnest desire the owner expressed to improve his soil.

Before anything can be done toward working out an operation plan, Long makes out a soil inventory. The average farm may have from 8 to 10 different kinds of soil; each different in its productivity, its rotation requirements, its fertilizer and lime needs. A farmer wouldn't attempt to handle dairy cattle the way he handles hogs, yet on most farms all soil is treated alike.

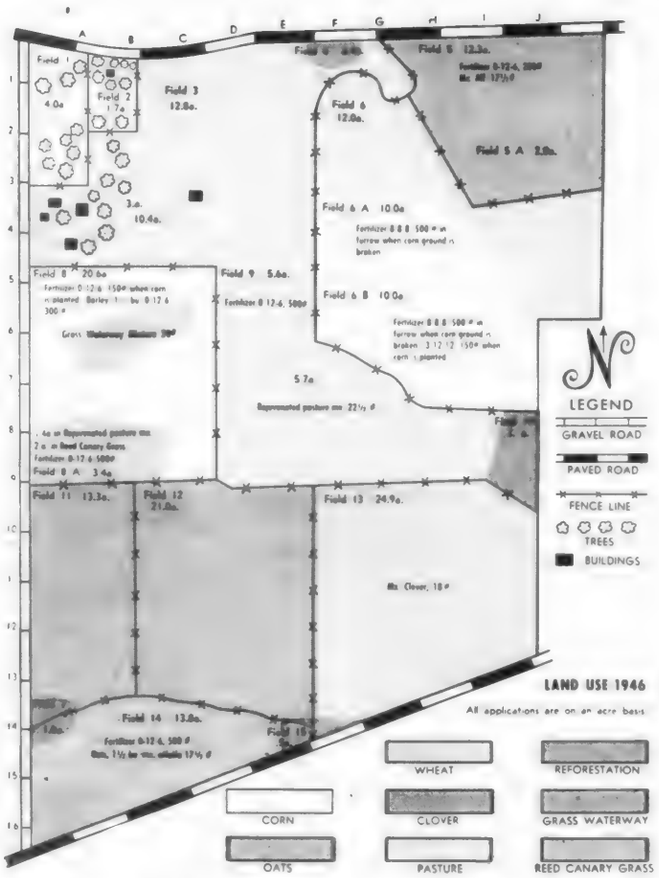
A soil technician makes the soil survey. For this he uses an aerial map as a topographical guide as he walks over the fields. From his training he can locate and identify the various types of soil by observation, color and texture.

After the soil types are designated and plotted on his map the technician will know in a basic way the capabilities of the various fields. If he runs into a rare soil type he always has the research files at the state university to fall back upon. Soil types tell what nature has put into the land, what crops it is best suited to growing, or if it should be put into crops at all. The soil type map for the Five Star Farm is shown on page 90.

With the soil type map completed the technician is ready to run his soil tests. These tests will indicate the condition of the soil at the present time, and show clearly what man has done to the soil. They will also give the key to what must be done to get maximum crop yields and build up the soil fertility. The samples are taken with an earth auger, according to soil types and fields. The standard is a sample taken every 425 feet in each direction.

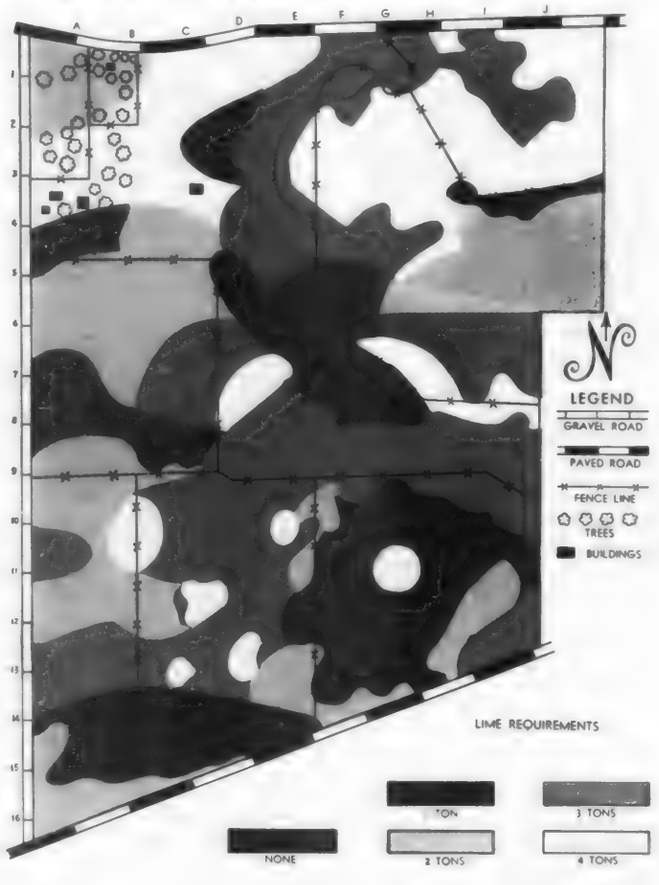
Next the technician will use a hand level of the Abney type to map the slope of the land. He will record all of the slopes and indicate what soil loss has taken place. Up to a 50% loss can be built back with planning. Beyond this it

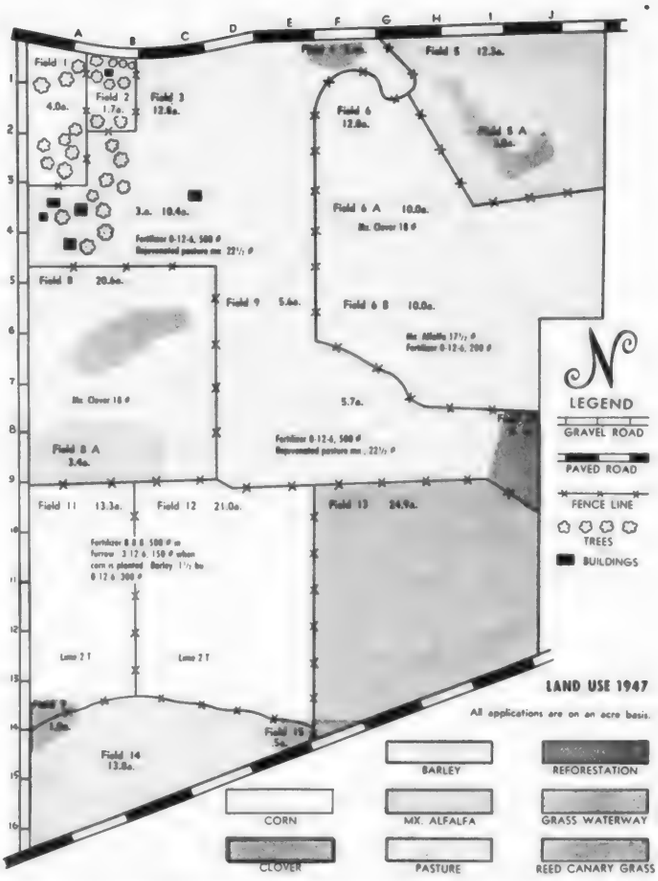
THE TOP-HEAVY CONTRAPTION mounted over the breaking plows in the picture on the left is a plow-sole fertilizer attachment. It puts a strip of fertilizer at the bottom of the furrow, as shown in the bug's eye view at the right. Later, when the corn is planted, the regular fertilizer application is made alongside the seed. The corn gets a start ahead of the weeds with the surface fertilizer. When the weather turns dry and the roots stretch down after water they pick up plow-sole fertilizer too. The results of this double application have made corn grower's eyes bulge; land that formerly grew 25 bushels suddenly produced 80 to 90. Foam rubber tractor seat addicts give the gimmick a sour smile. "You have to get off and load it with fertilizer too often," they say.



TO START the rotation, corn is planted the first year in fields which will later go into permanent pasture and alfalfa. These rolling fields will not be used again for corn.

LIMESTONE SHOULD be applied to small grains in the fall if possible, at a rate of not over 2 tons per acre at one time. If more is needed it should be applied in two years.





THE GRASS WATERWAY mixture recommended here is: 5 lb. sweet clover, 5 lb. alfalfa, 3 lb. red clover, 4 lb. brome, 4 lb. orchard grass, 2 lb. red top, 2 lb. timothy; seeded 25 lbs. per acre.

THE FIVE YEAR

Based on the Five Star Farm soil types, shown and described in the map on page 90, Long worked out the following land-use plan.

"There will be four types of land-use on this farm:

1. Legume pasture
2. Small grain, mixed alfalfa rotation
3. Corn, small grain and mixed clover rotation
4. Reforested areas

"The legume pastures will be that part of the farm either too rolling or too close to the streams to be cultivated.

"The small-grain, alfalfa areas are the fields which can stand occasional plowing but should never be put to cultivated crops. This is the land in the northeast and southwest corners of the farm. This will be in small grain one year, then in alfalfa and mixed grass four years.

"The corn, small grain areas are the more level fields which have been cultivated and also parts of the cleared woodland.

"The reforested areas will be spots of from one-half to an acre or more where streams enter or leave the farm. Their purpose will be to arrest erosion at these points, provide cover for wild life and to beautify the farm."

"Fields 8, 12, and 13 (68.9 acres)

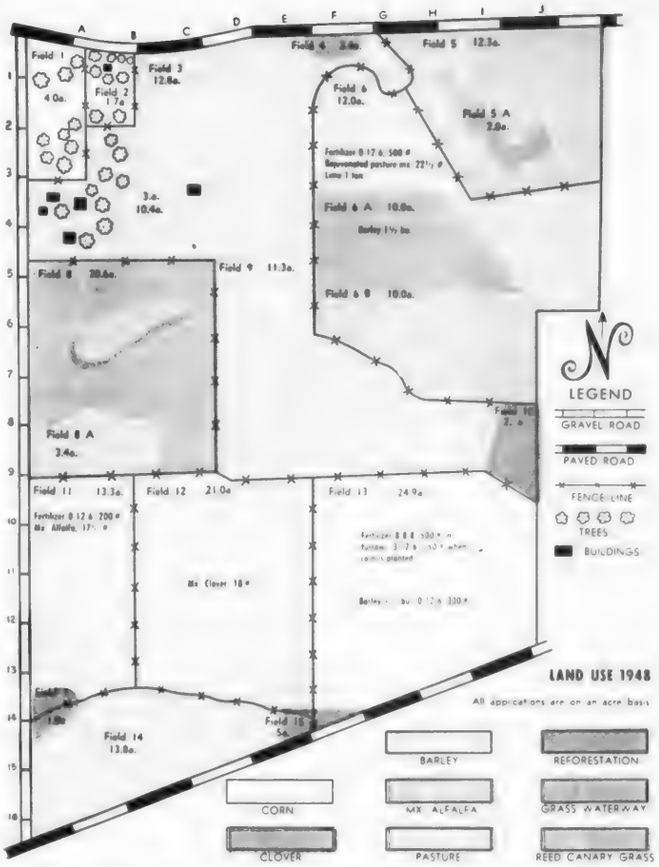
These fields will be operated in a three year rotation consisting of corn, barley and mixed clovers.

"Field 8a (3.4 acres)

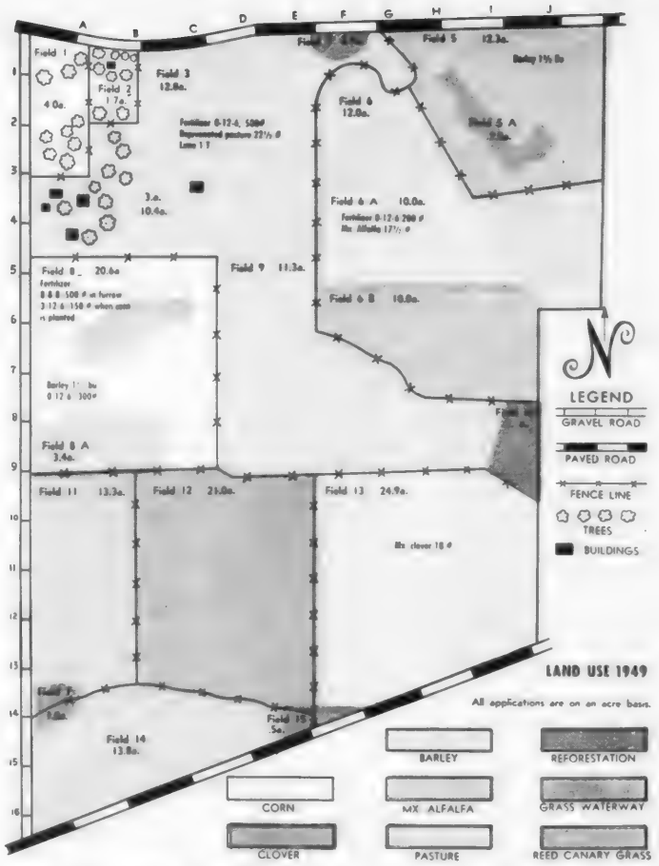
About half, or two acres of this area, is wet and should be seeded to Reed Canary Grass. This seeding can be done in February or March, broadcast. Sow six pounds per acre.

"Fields 5, 6, 6b, 11 and 14 (62.4 acres)

This rotation as shown by the land-use map will be, once it is well started, four years of mixed alfalfa and one year of barley



UNLESS ALFALFA is planted in oats in the spring it should be planted in ground that has been disked and kept fallow during the summer. The first soaking August rain is the time signal.



FOR THIS FARM the "rejuvenated pasture mixture" is: 5 lb. white clover, 4 lb. alfalfa, 3 lb. brome, 7 lb. lespedeza, 3 lb. mammoth clover, ½ lb. ladina clover; seeded 22½ lbs. per acre.

THE COUNTY AGENT should check all grass seed; a 99% purity tag is not a guarantee. The unknown 1% might be Russian thistle, dodder bindweed or some other ruinous weed.

LAND-USE PLAN

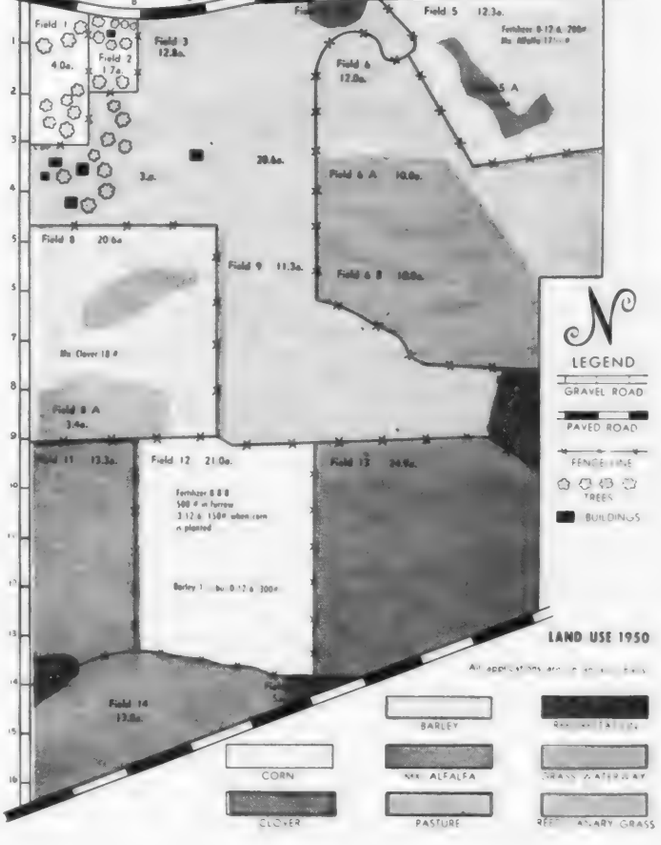
or other small grain. This will supercede the present indefinite rotation as rapidly as possible.

"It will not be possible nor is it desirable to get all this area into mixed alfalfa at once. As much of the area as possible should be put into alfalfa in the spring of 1946 and at least one new field should be brought into production each year thereafter until the whole area is in the rotation. Corn should never be grown on this area after this rotation gets started because of the fact the land is quite rolling and has already lost so much topsoil. However, in getting the rotation into full swing it will be necessary to have corn on some of the fields. These fields should provide most or all of the hay for the livestock once the rotation is well established. The idea is to continue a field in the mixed alfalfa as long as there is a good stand and then put it to small grain and go back to the mixed alfalfa the next year after the small grain is harvested. If oats are used for the small grain then the alfalfa should be seeded in the spring.

"Fields 3, 3a and 9 (34.5 acres)

In 1947 and 1948 after these woods are cleared, they should be pastured heavily early in April. As soon as the ground is dry enough to work, the field to be seeded should receive a ton of lime per acre, the land should be thoroughly disked and the permanent pasture mixture and the fertilizer called for in the land-use maps should be applied. Livestock should be kept off this area until the first of August and longer if the season should prove dry. It is desirable to pasture very closely the early part of the spring so as to keep down the bluegrass and thus give the legumes a good chance to get a start.

"Field 9 should be seeded as suggested for Field 3 in the spring of 1946. Brush will have to be removed for a good seeding job."



THIS IS THE $700 SCALE that Long advised Mrs. DeVaney to buy, the most expensive and probably the most profitable piece of additional equipment. With it she will be able to analyse and advertise her herd of black Angus. It will show which cows produce the largest calves at birth and whether they produce enough milk to feed them for rapid growth. Later weight records of each animal will show its ability to convert feed into flesh. From these records it also will be possible to determine whether the bull is transmitting his desirable qualities. Until her scale is set up she is using the one on the next farm. Her neighbor, in typical farm fashion, takes time to help with the job.

is expensive business, and the final recommendation may be to turn such land back to the Indians.

Fertility Comes First

Now that the spade work has been done, the mass of information is converted into colored maps which show graphically the slope, soil loss, available lime and minerals. A five-year plan is developed for the farm with crop recommendations for every field. The written reasons for each recommendation are given; nothing is done "just because".

The Hen or the Egg

Farm custom generally has been to plan the crops to fit the livestock on the farm. Long feels this is going at the problem backwards. The land-use plan based on soil type and capabilities should first be determined. From this plan the amount of production can be determined and the number of livestock of the kind the owner wants can be determined, based on supplying them with grass, hay and grain. If the farmer prefers to buy additional grain the livestock program can be adjusted to fit this contingency.

"The most important crop grown on any farm is grass and it must be grown whether or not livestock is kept." Long points out, "But my definition of grass includes not only the real grasses like brome and timothy, but all the legumes as well. Grass supplies organic matter, the keystone to the whole structure of soil conservation. The second most important crop is hay. After that comes the grain. This order of importance is especially applicable in the surplus grain producing sections of the country, for here grain usually can be purchased cheaper than it can be raised, considering the more profitable application of the farmer's time to other enterprises. If the grain must be shipped in from long distances then it would become more important to grow grain, if the soil is suited to its production.

"If the soil is flat, lacks aeration and is not properly tile drained, a drainage engineer is recommended. If the land is sloping and of the type that erodes easily, the Soil Conservation Service, with their skill at making water walk away instead of run away will be brought into the plan. The United States Weather Bureau in Washington has local rainfall statistics for practically every community in the United States. From these figures, based on the slope, the type of soil, the present erosion and the size of the farm, the need for mechanical devices such as contour furrows, terraces, dead furrows and grassed waterways can be determined."

Building Fertility Takes Time

Long is emphatic in his statement that successful farming cannot be conducted on a year to year basis, for his definition of successful farming requires that the soil fertility must be improved, and that is a long-term process. "Fertility," he says, "is built just as surely without livestock as with it. In fact, we think that often it is easier to build the fertility of the soil without livestock because we know exactly where and how much fertility is being distributed. Many farmers make such poor use of barnyard manure that they are only 'kidding' themselves when they store it in the barn lot, and then spread it months later.

"The first requisite of building soil fertility is the growing and proper use of legumes and grasses.

"All grasses add organic matter to the soil, but its greatest benefit is making available great numbers of bacteria and fungi. It contains untold billions of these willing slaves of the farmer whose work is only slightly understood at the present time. For many years the beneficial effect of growing legumes on the soil was known. What we did not know was that there was a symbiotic relationship between the bacteria found in the nodules on the roots of the plant, and the plant itself, which produced the beneficial results.

Fields Are Individuals

"If the most economical use of fertilizers is to be obtained, the fields must be considered individually. Tests have shown that one field may be low in phosphorus. Across the fence the field may be medium in phosphorus and low in potash. One

field may require two tons of lime to neutralize the acidity and another three, four or five. Not only has it been found a waste of money to apply more lime or fertilizer than is needed, but heavier applications may depress instead of increase the yields. It is more important to balance the fertility in the soil by the application of fertilizer tailored to fit the fields than to make a heavy application of 'all-things-to-all-fields' fertilizer.

Long's Five Star Plan

Let's look at Long's plan for the Five Star Farm. In his opening statement he is more complimentary than critical, that is, until he reaches the subject of trees. Mrs. DeVaney's devotion to her trees is well-known in the neighborhood, and there is the story about her coming upon the hired man in a pasture cutting down a scraggy willow. She gave him a stern talking-to on the subject of trees and concluded, "Don't ever cut another tree without my permission." He looked up in amazement and asked, "You wouldn't call a willer a tree, would you?"

In his general statement for the Five Star Farm, Long says, "In making the changes suggested herein no criticism of the operator is implied. In fact, she is to be congratulated upon the clean condition of the corn fields and the excellent condition of the cattle and hogs.

"The limited acreage of this farm makes it necessary, however, that every acre be put into cultivation. If that is to be done it will be necessary to clear most of the wooded area and put the part suitable to cultivation into crops and the remainder to permanent pasture.

"About one-third of the cultivated land is so rolling that it should be kept permanently in grass. The remainder of the cultivated land is not of a type well adapted to corn unless heavily reinforced by chemical fertilizer. Even under the best conditions it will be subject to erosion. It should be put to corn as seldom as the economic conditions of the farm will permit. All the tillable fields are well adapted to growing small grain and grass. With proper land use, the productivity of this farm can be doubled."

Wooded Area

Most of the trees on the farm are old and the livestock pasturing around them have destroyed the leaf mold under trees and the small roots of the trees. They should be taken out. Many of the trees are beech, which have low timber value. There is a clothespin factory at Spencer, Indiana, which should be contacted. The manager may be interested in making a bid on the beech trees. The few oak and hickory are valuable and should be sold for lumber at the same time.

"The land in permanent pasture has osage orange trees scattered over it. These would make valuable corner posts. It would not be a difficult matter to double the carrying capacity of this permanent pasture were it not for these scattered trees. Wherever these trees are located they use up all the fertilizer intended for the grass and it is not practical to undertake to improve the pasture with the trees in it.

"There are only a few trees that cannot be removed quickly and cheaply with a bulldozer. Loyal Gram, near Greencastle, has a bulldozer and would do the work."

Small Grains in Corn

With Long's Farm Clinic plan the soil does not lie idle. For soil, like water, is restless. There is no such thing as *status quo;* it is either building up or tearing down its fertility.

A corn field is not allowed to be uncovered the winter following harvest. Long's program for small grain planting in corn fields is as follows: "There are two reasons for seeding in the corn at the time of the last cultivation. The first is to provide a cover crop during the winter to prevent erosion and leaching. These growing crops take up this material and hold it for the crop next spring. The second reason is to add humus which all soils on the Five Star Farm need.

"Rye should be used for the first year of the five-year program, or until the application of lime has had time to take effect. While sweet clover is more desirable than rye, it is so susceptible to acid soils that it is not worthwhile attempting it until the soil has been neutralized. The same is true of barley. If rye is used, newly threshed seed must be used as old rye does not germinate well.

"In addition to this, rye or barley will furnish fall pasture. In seasons of excessive rainfall these grains may germinate soon after seeding and will joint in the fall and be winter killed, but they will serve their purpose anyway.

"The yields of sweet clover in corn the first year or two will be small but do not get discouraged and quit seeding it. It will get better each time it is seeded. It will not take more than a dollar an acre to provide the sweet clover seed. At that rate, a very small yield will pay off in nitrogen added to the soil. Nitrogen is the most expensive element used in fertilizers. It costs about fifteen cents per pound. Sweet clover contains about 50 pounds of nitrogen per ton. If there is a yield of as little as 300 pounds per acre in the corn, it would more than return the money expended for clover seed in nitrogen alone, to say nothing of the humus and winter cover value.

How To Seed

"Rye, barley, or sweet clover may be seeded by mounting an endgate seeder on a farm wagon. The wheels are high enough not to break the corn.

"It would be possible with a little ingenuity to mount the seeder on the front of the tractor. This seeder will sow about eleven rows at a time. A bushel of rye or barley or twelve pounds of white blossom sweet clover per acre should be used.

Oats: A Bet on the Weather

"Even with ample fertilization there is no assurance of the increase in yield of

MOVABLE CATTLE FEEDERS on another Long planned farm. They are placed on thin spots which need manure. There is no loss of manure by leaching, and if the feeders are moved often there is no need to scatter it; shuffling hoofs do this.

oats," says Long, "but the Farm Clinic Plan gives that possibility a break. Oats depend more on the season than on the fertilization. If the season for oat production is good, that is, if it is cool and there is an abundance of moisture, almost any field will make a good crop of oats. If the conditions are unfavorable, such as a very hot and dry spring, the oat yield will not be good, regardless of the richness of the soil on which the crop is planted, or the amount of fertilizer applied.

"The real purpose of applying the fertilizer to the oats is to insure a good stand and a luxuriant growth of the following crop of clover which is seeded with the oats. In fact, the application of the proper amount and kind of fertilizer to the soil when the oats and clover are seeded, if the soil is not acid, will practically insure a stand of clover. Under this method, a crop of clover may be expected with certainty at least 19 times out of 20, regardless of the season.

"For the Five Star Farm the oats should be Tama, Vicland, Clinton or Benton. These varieties have greatly outyielded others."

Pastures and Livestock

When the plan outlined is in full operation, Long says, "The Five Star Farm will produce the grass and the hay, but not all the grain for the following livestock:

30 purebred Angus cows
27 calves
5 yearling heifers
1 bull
12 sows
168 fat hogs sold at 225 to 250 lbs.
500 turkeys

"The cattle will receive very little grain and will be maintained chiefly on legume pastures and legume hay. The hogs will be produced mostly with the corn grown on the farm and on legume pasture. The hog quota can be maintained at the present time. The cattle quota will not be reached for a period of four or five years since the herd is to be built up by the natural increase of the present animals, rather than through purchase."

To support this number of livestock the pasture plan was given an important place in the five-year program. Long's recommendations are, "Pasture is the cheapest feed the farm animals receive. They should be on pasture every day possible.

"Two-thirds of the farms we study do not have sufficient pasture and most farmers complain that they cannot afford to have pasture.

"This is usually due to two things:

1. The pasture is not properly fed.
2. The pasture is improperly grazed.

"The poorest land usually is put to pasture with the idea that pasturing alone will build it up. This is not true. Plants must be fed the same as livestock. If they are to produce profitably, they must have a balanced ration.

"There are three ways in which the pastures are mistreated while being pastured.

"They are pastured too early, too close during the season, too late in the fall.

"There is no advantage in pasturing too early. The grass contains little nutriment and is badly damaged. Every mouthful of grass the animal takes too early in the season costs the owner five mouthfuls later.

How Early To Pasture

"Just how early to pasture depends upon the kind of grass to be pastured. It is better to be governed by the height of the grass than by the calendar. Most grasses should be three or five inches tall before grazing starts. Sweet clover is one of the first plants to reach this height in Indiana. Then comes alfalfa, followed by other clovers. Blue grass and timothy are late starters."

"At no time should grass be grazed closer than 1½ to 2 inches of the ground," recommends Long. "The stock should be removed to give the grass an opportunity to recuperate. Plant food can be made only by the green leaves, and some green leaf material must be left if the grass is to start quickly. Grazing beyond this point is hard on both the animals and the plants. Grass will produce more stock feed if grazed or clipped to keep it to five or six inches. As the grass becomes mature it becomes more woody and less digestible and its protein or muscle or milk-giving qualities decrease. A field should be clipped any time a pasture becomes uneven or weeds threaten to seed themselves.

Rotation Grazing

"The productivity of a pasture will be greatly increased by letting the stock remain on a field for two or three weeks, depending on the moisture conditions. They should be off from two to four weeks or until the grazed pasture has had time to recuperate.

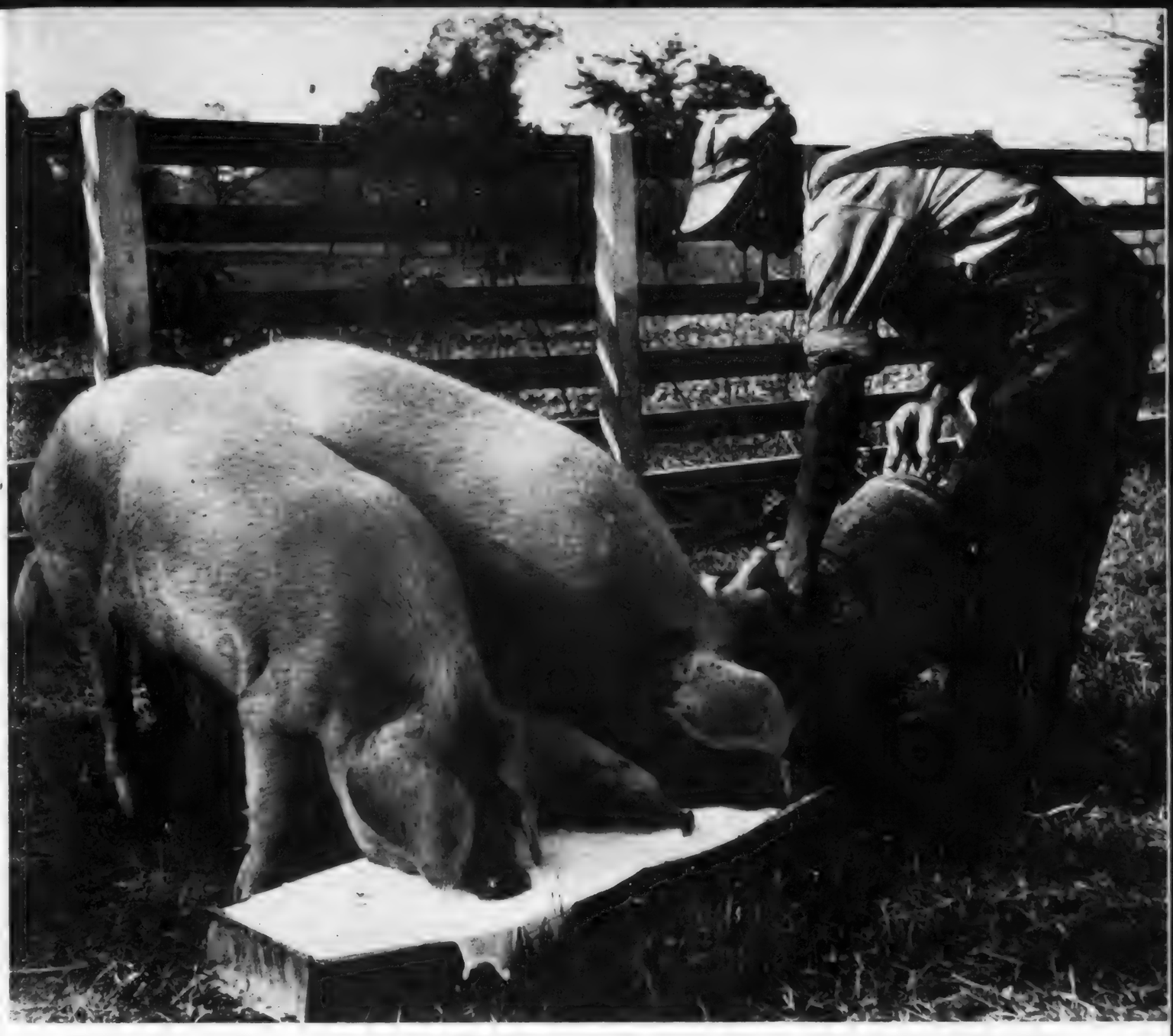
"Rotation grazing is a simple procedure when the fields are small. On the large fields it may be necessary to partition it off with an electric fence.

"The smoothing harrow should be run over the pasture frequently to scatter the manure. This will cause more even grazing.

Portable Silos

"It is impossible to provide sufficient grass for the stock throughout the year without having an excess during the best growing months of May and June. This excess can be profitably taken care of with a moveable wooden or metal silo. When the dry weather produces a shortage of grass in August, the silage will be available. Fortunately, grass silage can be put up during wet times when no other field work is possible.

IRONWEED IS PICTURESQUE in late August when it blossoms with a purple flower, but animals won't touch it. There is only one cure; clip it before it seeds.



IN INDIANA, hogs have always returned a greater profit than any other animal for the capital, labor and feed invested. Long's hog plan for the Five Star Farm calls for early spring litters of hogs, kept under sanitary conditions. The skim-milk being fed these hogs is a fine protein supplement, good for rapid growth.

"Fortunately, grass silage can be put up during wet times when no other field work is possible.

"Building a silo used to be an expensive undertaking. Now there are several types of inexpensive movable silos. The method of construction of the wood stave wooden hoop movable type is shown.

"The use of these movable silos is in line with the movable hay barns and movable sheds in that it helps to keep the stock out on the fields, causes better distribution of manure and lessens the work of handling the manure. The same machinery used for putting up hay in the field can also be used for silage making."

Handling Manure

Although Long's plan can be worked out for a farm that has no livestock the plan for the Five Star Farm anticipates an abundance of manure. He advises, "The plan of soil conservation contemplates that all the manure produced on the farm will be carefully preserved and distributed as indicated. Unless this is done, best results cannot be expected. Any manure left to leach in the lots or deposited in forest areas is lost to the farm.

"It would cost about $15.00 to purchase in commercial fertilizer the plant food in the manure produced by one animal unit (1 horse or 1 cow or 7 sheep or 1400 pounds of hogs) in a year. Under practical farm conditions 75 per cent of this value may be saved. but by methods frequently used, less than half is saved and sometimes practically none is saved.

Composition of Mixed Cow and Horse Manure

	lbs. per ton	*Value*
Nitrogen (N)	10	$0.95
Phosphoric Acid (P_2O_6)	5	.31
Potash (N_2O)	10	.47
Lime (CA)	6	.02
Total		$1.75

This does not take into account the great value of the organic matter manure returns to the field.

"Milk, egg. or wool producing animals return to the soil about ¾ of the nitrogen they take out. Other animals return practically all of it. Each 100 pounds of milk sold removes from the soil about 5 lbs. of nitrogen, 2 lbs. phosphoric acid and 1.8 lbs. potassium.

"Nitrogen and potassium are both lost by leaching. Manure exposed to rains while piled up around the barn sustains great loss. Any time steam is seen rising from manure nitrogen is being lost by heating and forming ammonia gas, its value is growing less and money is being lost. If plenty of bedding, such as straw or shredded corn stalks is used and is carefully protected little or no phosphorus is lost."

On plug type welders built for the farm the plugs are often 10 to 25 amperes apart and the amperes between are lost.

SOLUTION: ***Get a Miller —the Welder with no Missing Amperes***

● The new Miller Farm Welder, with "SWING LOCK" heat selector, produces an infinite number of ampere settings. You get the correct heat for each job. There are no missing amperes. The Miller Farm Welder meets all requirements for operation on rural and REA power systems. The Miller has the high degree of Power Factor Correction so important in a Farm Welder.

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The Livestock Problem

Mrs. DeVaney's past success with beef cattle and hogs was the basis of Long's recommendation of an extensive livestock program for her farm. He analyzes her program for her farm.

"To establish a real breeding program, one which will prove the dams and sires and attract attention of the breeders of beef cattle, the following plan is suggested:

"Weigh each calf at birth and at weaning time, again when the cattle go on grass and when they are one, two and three years old. You will need scales for this, and the cost will be around $700.00 installed. This is the most expensive and one of the most profitable pieces of additional equipment we have recommended. The scales will show which cows produce the largest calves at birth and which cows produce sufficient milk for calves to make them grow satisfactorily. Later weights will show the ability of the animals to make use of feed. This information will show whether or not the bull is transmitting his desirable qualities.

"Such a plan, coupled with a judicious but inexpensive advertising plan will build a farmer-breeder market for this type of cattle. It will sell the cattle at a price sufficiently above that of grade cattle to make the enterprise profitable.

"Nearby farmers always have the notion that people in the next county or the next state are more favorably situated than are their neighbors. They live so close to their neighbors that they can see only their defects. The average farmer prefers to go a long distance to purchase his bull or to replenish his herd.

"These psychological facts should be taken advantage of in planning the advertising program. Of necessity, the advertising budget must be small. It is for this reason that we would select one or two good farm papers and then select the leading local papers in the towns within a radius of 50 to 75, or not more than 100 miles."

Profitable Hog Production

Long recommends hybrids in hogs as well as in the corn field. He says, "Most hog producers believe that better results are obtained if they use a purebred sow of one kind and a purebred boar of another. This hybridization seems to produce a little more hardy individual as well as characteristics which cause the hog to fatten more readily."

"The time of year in which the pigs are farrowed will depend upon the number of litters to be produced per year. Some breeders make a practice of using gilts and send them to market along with their pigs, thus producing only one litter per year per sow. Others regularly produce two litters a year and a few follow the plan of producing five litters in two years. Each method has proved successful, but the most common method is the producing of two litters per year.

"There are several hog producing states north of Indiana where the sows must be farrowed late in the spring on account of the severe winters. This causes a heavy run of hogs on the market after the middle of September. The Indiana climate is such that we can successfully farrow hogs in the latter part of February or the early part of March without much trouble. In this way we can get on the market ahead of the northern run.

"As a labor saving practice it is suggested that the movable hog house shown

WHEN THE Five Star Farm plan is in full operation the hay for the cattle will be chopped and stored in movable silos in the fields. Grain will be fed in movable feeders. Labor costs should be cut about one-third.

C&L SILOS—PROFITABLE FARMING

Silage is the most economical feed produced on the farm. C&L Silver Shield all-steel, galvanized silos handle all types of silage — legumes, grasses and corn — furnishing better feed at less cost per ton. Having rendered more than three decades of service C&L Silos are still the first choice of leading farmers for permanence and economy. Available in all popular sizes for 1947.

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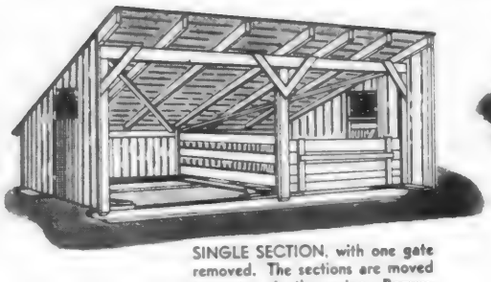
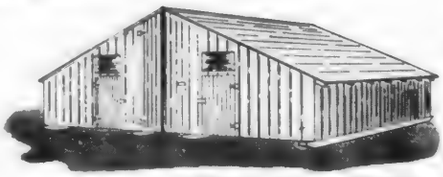
MOVABLE HOG HOUSES



SINGLE SECTION, with one gate removed. The sections are moved to pasture in the spring. Removable floors make cleaning easy.



SECTIONS PULLED TOGETHER
For winter use, two sections form a complete, enclosed shed.

be placed upon a cement platform near the barn during farrowing time. The pigs must be kept in the pen in which they are farrowed until they are large enough to go out to the open fields. Under these conditions it would be better if the pigs were farrowed about the middle of March. The weather and grass conditions are generally not suitable to put the pigs out until the first of April."

Water for Hogs

"One of the most difficult problems connected with hog raising is the water supply. Sometimes hogs must come back to the barns for water. This practice nullifies all the advantages of the movable hog houses and is fatal to profits in hog production.

"Where cement tanks are placed in the fields, the hogs root holes in the ground, all the manure is conjested in one spot, and it is impossible to get close enough to the tanks in plowing the fields to make the ground around them sanitary.

"A better method is to provide metal tanks on sleds and above ground water pipe from a central supply. In this way the tanks can be moved and the sanitation and manure controlled. Since the hogs are not on the fields during freezing weather, there should be no loss of pipe from freezing. It is uncoupled when the hogs are taken away. There is a quick coupling device on the market, made by Commercial Metal Treating, Inc., 177 South St. Clair Street, Toledo, Ohio.

"Some of the most successful hog raisers in this state haul water to their hogs. This may sound like a terrific chore but it is not difficult when a large tank wagon is used."

Putting Up Feed

"It costs much less to put up the hay in the fields where the crops are grown. By using a buck rake the hay can be picked up and moved to the movable haymow. A silage cutter is used to cut and blow it into the mow. One man can put up hay if it is impossible to get help. He can bring the hay up to the cutter with the rakes and then pitch it in before getting another load. If two men are available, hay making can proceed at a more satisfactory pace and three men are all that would ever be needed.

"The cost per ton of putting up hay by this method is about one-half the cost of putting it on a loader and hauling it to the barn, and about one-fifth of what it costs to bale the hay and put it into the barn."

"The type of beef cattle mentioned in this plan require very little shelter. The only time at which it is profitable to have them under shelter is when it is raining, snowing, or when a cold wind is blowing. This amounts to about ten per cent of the time, or approximately three days a month during the winter. Actual tests have shown that cattle make more rapid gains under these conditions than when kept in a closed barn.

"The type of hog houses we suggest protect the caretaker, as well as the hogs. The aisle between the pens offers shelter for him while working with the sows. This means he will work faster and better. It is practically impossible to care for the sow properly at farrowing time when she is in a small type hog house.

"From the standpoint of efficient hog production, it is absolutely necessary to keep the hogs away from barns and straw stacks and on clean ground. Hogs should not run on the same field or lot two years in succession. By alternating their lots the sunshine and rain will purify the soil. If hogs are kept on the same lot continuously for even two years, the soil becomes contaminated and the little pigs start off at a disadvantage. The young pig will pick up enough worm eggs in a few minutes on an old lot to last him a lifetime.

"The saving of one pig per sow increases the income per litter about 20%. Worms in hogs increase their cost in production about 25%."

Do long term planned farming programs work out? One of Long's first big assignments was the 450-acre farm of Henderson & Smith at New Richmond, Indiana, which started a five-year program in 1939. The results of the first five years are the answer to the question.

"The profit on beef production was greatly increased during the clinical period because beef is being produced largely with grass whereas in the pre-Farm Clinic period he produced it mostly with corn. The grain investment in each cow now is 30 bushels against 75 to 90 under the old feeder plan. In the pre-clinical period, beef and pork sold for about 12c a pound

(Continued on page 120)

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POULTRY EQUIPMENT

(Continued from page 45)

ways be left where large amounts of surface water concentrates and flows. The grassed waterway will prevent erosion and save the tile beneath. The grass strip should be from ten to thirty feet wide, depending upon the drainage area. Grassed waterways are important, regardless of whether the land is tile drained or not.

(3) *Blowouts* — When a tile drain is overloaded and changes from a steep to a flat grade down stream, the tile in the flat grade will not be able to handle all the water coming from the steeper grade above. Pressure develops in the tile. Water will be forced up to the surface near this point and a hole washed out. A concrete or brick well built up to the surface at the point where the grade changes abruptly will permit the surplus water to escape as surface flow without blowing out at a tile joint. Good design would provide for a larger tile for the flatter grade.

(4) *Draining "Pot holes"*—The drainage of low spots having no natural outlet for surface water require larger tile drains than wet soil upon which surface water does not accumulate. In other words the drain tile must be a storm sewer. The tile main for these conditions should have from two to three times the capacity required under ordinary conditions.

Drainage Outlets

No drainage system is any better than its outlet. All tile drains eventually discharge into open channels. Many of these are artificial ditches draining thousands of acres each. They are invariably dug to a very flat grade. Most of them begin silting up shortly after construction and need recleaning within ten to fifteen years. Maintenance of open ditches is a serious problem in flat areas of extensive drainage. Drainage laws are invariably antiquated as far as provision for maintenance is concerned. It is, in most cases, just as complicated a job to secure minor maintenance as it was to construct the new ditch.

Whenever a ditch becomes silted up above the level of the tile drainage outlets, there is danger that the entire tile systems will fail permanently. A small amount of annual maintenance will make a good drainage ditch last indefinitely at smaller cost than if less frequent attention were given it.

Failure of drainage ditches, particularly silting up, can be materially reduced if all land owners will do a better job of conserving their soil. All the earth removed in cleaning ditches was once top soil on someone's farm. Perhaps there will come that happy, happy day we can have clear water floods.

Outlet Structures

The outlet of a tile drain into an open

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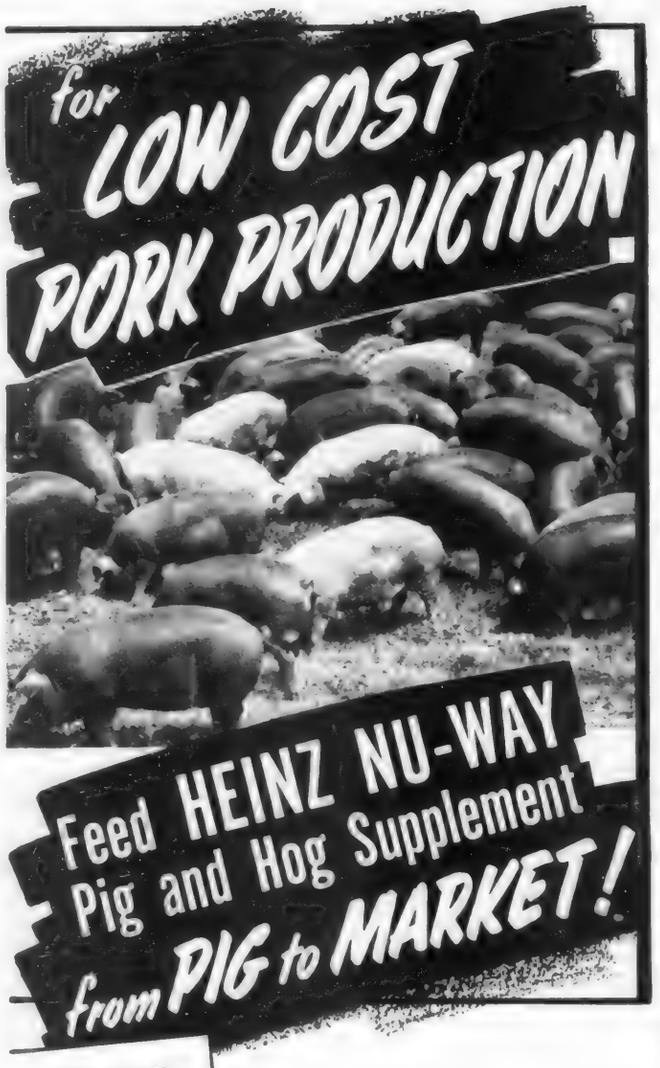

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Cincinnati 17, Ohio

channel is a critical point. The destructive forces of freezing and thawing are particularly severe at the exposed end of a tile line. Wherever possible the drain should end in a rigid iron pipe at least ten feet long. This pipe should project a short distance into the stream to prevent bank erosion, and into the earth at the other end beyond frost danger. When the tile line follows a depression where surface water concentrates, the tile line should be curved down stream as it approaches the outlet ditch. Then no surface water will enter the open ditch directly over the tile outlet. Avoid having a series of laterals entering directly into the open ditch. This can be done by having an intercepting main parallel to the open ditch, as described above. The laterals can be connected to this main. It is cheaper to do this than to have many outlets to construct and maintain. An iron grating at the end of the drain will prevent animals from entering.

Maintenance of the Tile System

A well designed tile drainage system does not require much maintenance, but what maintenance is needed is of tremendous importance. A single broken tile may cause the permanent failure of the entire system above the break. Holes in the ground above a tile line may be a warning sign of a broken tile a short distance below. All outlets should be inspected and repaired at least once a year. Watch out for signs of erosion above tile lines. Many tile drains installed forty or fifty years ago to a depth of thirty inches are now only eighteen to twenty-four inches below the surface. The top soil is not only gone forever, but the tile are so shallow there is danger of breakage from farm machinery passing over them. Drainage, because it reduces surface runoff, will tend to reduce soil erosion.

Drainage and Water Conservation

Tile drainage tends to reduce flood crests. It reduces surface runoff by keeping the water table below the surface so there is ground storage space when more rains come. The drains feed this water into outlet channels more slowly than surface runoff would occur. Tile drainage creates an underground flood storage reservoir. Tile lines seldom remove water faster than three-eighths of an inch in twenty-four hours.

There is a growing interest in an attempt to conserve water by plugging the tile lines as soon as the ground has dried sufficiently for cultivation. The Marsh Foundation Farms, near Van Wert, Ohio, report increased corn yields by following this practice. In a few cases removable dams have been placed in outlet ditches to regulate discharge according to soil moisture requirements. A limited amount of irrigation has been done by pumping water into tile lines during times of soil moisture deficiency. More research is needed in this field.

Drainage, a Safe Investment

Drainage of wet, fertile land is a safe investment provided the owner is also a good farmer otherwise. Many successful farmers report that their drainage has paid for itself in from five to ten years. Proper drainage constitutes one of the safest investments and the most permanent improvement possible on farm land, provided the land is basically fertile and needs drainage. Much of the best land in the corn belt could not be farmed at all without artificial drainage.

Ralph Waldo Emerson has said: "This year a very large quantity of land has been discovered and added to the agricultural land without murmur or complaint from any neighbor. By drainage, we have gone to the subsoil and we have a Concord under a Concord, a Middlesex under a Middlesex, and a basement story of Massachusetts more valuable than all the superstructure. Tiles are political economists. They are so many young Americans announcing a better era and a day of fat things".

Prices

The 1946 price of tile per 1,000 feet for the various sizes was as follows: 4"—$43.60, 5"—$65.90, 6"—$91.20, 8"—$157.80, 10"—$253.80, 12"—$325.60, 14"—$423.00, 15"—$545.00. The first four sizes regularly are made one foot long, the last four, two feet long.

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The Case of the Milking Shorthorn

Sirs:

In the summer issue of "The Farm Quarterly", an article appeared under the heading "The Choice of a Dairy Breed", with illustrations of the various types of dairy cattle and including a picture of a good representative Milking Shorthorn cow. Under picture, on page 11, is the statement, "The Milking Shorthorn is better for beef than milk, but is a good family cow". This is misleading and I hope we may be permitted to set the records straight.

There are two distinct types of Shorthorn cattle and they are both horned and polled animals in both types. Beef Shorthorn cattle are bred for beef purposes only, while Milking Shorthorn cattle have, since the beginning of livestock improvement, been developed with good milk production and they are the oldest of improved livestock from the standpoint of purebred registration in America.

On page 15 of the same issue, second paragraph at top of page, appears this further misleading statement; "The Shorthorn breed, nominally regarded as a beef animal entirely, has been developed in England as a dual purpose animal. There is some question of the dairy value of the so-called Milking Shorthorn".

Milking Shorthorns ,or Dairy Shorthorns as they are called in England, make up more than 70 percent of the total cattle in that country and they produce more than 60 percent of the milk produced in the British Isles.

In England, as in this country, there are two types of Shorthorns. The beef type are, of course, bred for that purpose and the breeding is as different as to bloodlines as between Holstiens and Jerseys. In milk production the Dairy Shorthorns of England have held their own with the best, including the world's milk production record, which was only topped two years ago. It should be added here that the Milking Shorthorn breed still holds the world's

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butterfat record, on Melba 15th of Darbarlara, that produced 1614 pounds of butterfat in 365 days. This record has stood since 1922.

Another record worthy of mention is that of the English cow, Winton Gentle 3d, that has produced 223,917 pounds of milk with 15 calves on two milkings a day only, believed to be a world's record on twice a day milking. Messrs. J. R. Burge and Son, Winchester, England, own this great cow and have produced nine others in the herd with long distance records exceeding 100,000 pounds. Herd averages from 8,000 to 11,000 pounds are not uncommon. This is just to quote a few, but the dairy business is monopolized by these so-called Milking Shorthorns in the British Isles.

The Milking Shorthorn cattle of the United States are descendants of the English cattle imported from time to time. They are called dual-purpose cattle in this country to bring out the very thing that has made them England's popular breed. That important characteristic is the ability to lay on flesh easily when through milking, making the most of farm grown feed, and sell for top prices as beef when their usefulness at the paid is over. In America, we are just celebrating our 100th year of registration.

As to milk production, the many cows that have produced upwards of 20,000 pounds would require too much space to enumerate. In fact, when pushed for high production, and all high records are forced, Milking Shorthorns have always been able to hold their own as proven by the fact that no other breed has topped them to date in butterfat production. On the American farms, when upwards of 20,000 cows of all ages produce an average of 8,250 pounds milk and 330 pounds butterfat, they are producing at profitable speed. These are records made on the farms, 95% on two milkings a day on a basis of profit over cost. Take a look at DHIA records—note profit over cost of feed.

We could rave about a few high records, but the big business of any breed is with the farmer who must make a living from his herd. He will feed what the cattle pay a profit on only, otherwise he will be unable to make a living. There are more farms where specialization is not practical or possible, than any other kind. It is estimated than 75% of the farms in America are of this general purpose nature. Because Milking Shorthorn breeders are building and producing this dual-purpose breed to fit this field, they should not be spoken of as *"so-called"* Milking Shorthorns? The facts show that Milking Shorthorns have made the most rapid gain of all purebred breeds in the United States in the past decade. The farmers like their rugged constitutional makeup, which makes them most adaptable to handling under the conditions prevailing on the average farm.

On page 13, above the picture of a mixed herd, is this statement, "Mixed herds of scrub cows have almost disappeared from American Farms. Once a sort of compromise between milk and beef, they are being replaced by stock exclusively bred for beef or for milk. Farmers have learned that you can't have both from the same animal."

To begin with, the small percentage of purebred cattle in the country have made but a small dent in the scrub herds. Less than five percent are purebreds. However, these have worked a marked improvement in grade herds and farmers are rapidly finding that it is not only possible, but practical, and far more profitable, to use cattle from which both beef and milk can be produced. That is why the demand for Milking Shorthorn bulls for "Grading Up" purposes give the breeders of these dual-purpose cattle, the best bull market of all breeds. That is why you see more red, white and roan colors in mixed herds than any other kind.

I am pleased to furnish you proof of the beef value of steers that are produced from Record of Merit cows that in addition to a market-topping beef steer, produced 8,000 to 10,000 lbs. of milk and from 300 to 400 pounds of butterfat. At the 1939 National Dairy Show, the cows

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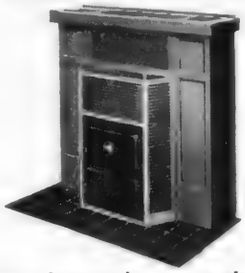

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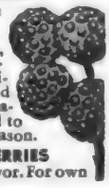

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shown in the aged class averaged 10,066 pounds milk and 410 pounds butterfat. All of the above I hope will be properly understood as being an honest effort to keep the records straight, not an attempt to disparage any other breed.

We appreciate the good work done by our friends of the dairy world, and there is room for all of us. They, however, are limited to the narrow field of specialized milk production.

The same is true of the beef producer. His field is limited to the larger acreage and numbers of cattle that can pay out on just "A calf per cow per year" basis. The vast majority of farmers are the middle of the road, general purpose type. That is the field Milking Shorthorn cattle are bred to fill. They work out better under those conditions than any other breed. I might add, that it is on such farms that the bulk of the milk and the beef is being produced, because there are so many more of them. It will always be that way.

Only the man who is so blind that he won't see, can ignore the facts that are confronting him, whether it be from observation as he moves around the country, or from factual information available from the various breed Associations. Some of the attitude toward dual-purpose cattle can perhaps be understood in the fact that our colleges, except for two or three that actually keep in step with the times, do not have any place in their educational program for the enlightenment of their students on dual-purpose breeds.

They simply have a dairy and beef program and in years past some have gone as far as your article and said that it was not possible to produce milk and meat from the same animal. It is amazing how long some people can remain in ignorance. I feel that it is due the Milking Shorthorn breed, after such misleading information has been allowed to get into your splendid publication, to set the record straight.

W. J. Hardy, Secy.
The Milking Shorthorn Society.

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THERE WERE GIANTS IN THOSE DAYS

(Continued from page 27)

others are but memories. A few can be identified as the progenetors of present models but most of them have gone to the museums and scrap piles.

During the depression tractor designers went conservative—the four wheeled type becoming the standardized tractor. The complicated freaks disappeared, and not until the coming of the modern general purpose type was there a pronounced innovation. Many of the old timers had "modern" features, over a decade neglected, but now restored to favor. Some of the big ones had cabs—not heated and air-conditioned, as they are today, but adequate. Sound proofing and radio equipment are also quite modern. The three-wheeled motor cultivator of twenty years ago, seen a few rods off or in the twilight, could well be mistaken for a general purpose tractor of today.

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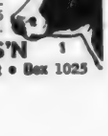

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Larger Units Needed

Now that the farmers' pocketbook is better lined, there is a trend toward buying bigger and higher powered machines for the heavy pulling, and smaller tractors for supplemental jobs like cultivating and belt work. The proper coordination of large and small power units is necessary for efficient farm operation. In the early days of farm power this was impossible, and today it is but rarely attained—for any diversified farm can use to advantage not less than six sizes and designs of tractors, from garden power hoes to track layers. One and two plow tractors do not sufficiently increase the worker's output in these days of labor shortage. We need a set-up in which large multiple furrow outfits are used for the main plowing job, and one and two plow auxiliaries finish the fields. There is also a lack of coordination in large capacity farm machines, particularly in the handling of materials about the farm. This has long been the most serious bottleneck in farm operation. The work of combines, corn pickers, field balers and forage choppers is limited by the use of bags and baskets, forks and shovels, all of which should be superceded by bulk handling equipment and field cranes. The development of this line of agricultural automotives is just beginning and in it we have a main factor which will encourage the manufacture of larger, higher powered tractors. It takes a tractor of some size and weight to handle present-day manure and earth loaders which lift more than a ton. Many "two plow" tractors are really too light for this service.

It is probable that the adaptions of the automobile of war to peace time activities will not be as extensive as some folks imagine, at least, not in agriculture, nor will the inventions of war contribute much to farm machine designs. The reverse is true; the machines of war will be adaptations of farm machines just as in World War I the tank was an adaption of the tracklayer farm tractor which preceded it. Farm work is specialized and requires specially designed machinery. The war-engendered innovations are more likely to be along the line of the use of better materials, more aluminum and light weight alloys, more rubber and molded plastics in farm machine construction, rather than any drastic changes in design. For the duration we had to be content with inventive conservatism, but once the pressure of war's restrictions is entirely removed the farm machinery industry will be ready with a flood of new ideas, designs and materials.

Crystal Ball Stuff

One very badly needed development will be the gas-electric tractor, that is, one in which the attached electric generator supercedes, or is in addition to, the conventional power take-off shaft. Such a tractor would furnish power for electric drive machines, and such a system would avoid all the annoyances and limitations of belt drives. A belt, of course, must run straight, but an electric cable can carry power upstairs and downstairs, and around corners, regardless of wind and weather. The gas-electric tractor also could furnish light and heat, and a strong current for electric soil sterilization, and weed and insect killing in the field. An electric weed killing machine is now in commercial production in Californa. All this will take larger and more powerful tractors. There is also the possibility of small electric garden tractors driven by power from wind chargers. More remote are mercury engine tractors and the use of atomic power. We are still in the infancy of farm power evolution.

Farm implements in which the tractive member is a built-in integral feature have always had the advantage of facility of movement over those composed of a tractor and rear pulled implement. But their high first cost worked against them, and this contributed largely to the abandonment of the large type, self-propelled combine in California around twenty years ago. Now we see the idea revived in several medium-sized combines, some new crop harvesters, sugar cane and sugar beet harvesters, cotton pickers and others. The mounted type corn picker is a close approximation. The idea can be further developed by the use of interchangeable power units, and convenient lifting and transferring facilities, for the changing of power plants from one machine to another should not be a difficult engineering problem. This is obviously closely linked with the further de-

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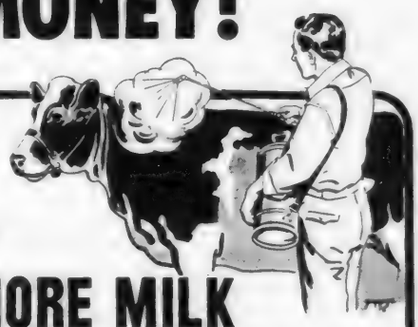

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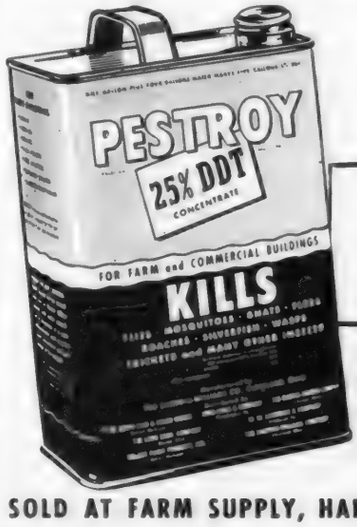

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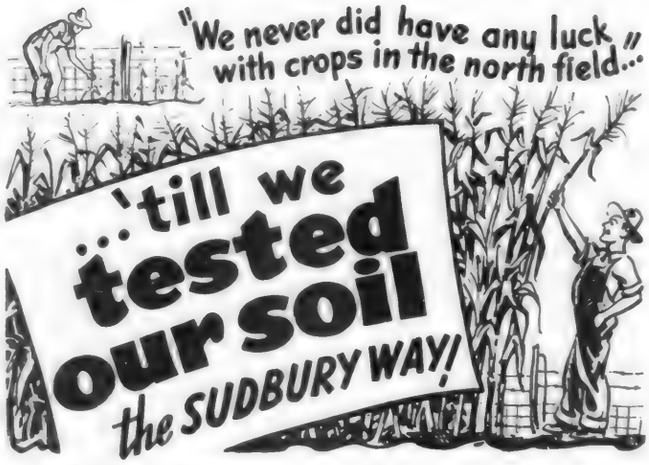

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velopment of tractor mounted implements in preference to rear pulled implements. The development of hydraulic control means that far heavier tools can be put under the easy control of the operator. It may be one of the curious twists of engineering evolution that hydraulic control, pioneered by the Ford-Ferguson System, as a convenience in small tractor operation, may be the means of bringing back the large tractor to popularity due to its more facile and versatile use. One result will be the increased use of combined rotary tillage or soil milling equipment. The big tractor of the future may not pull a dozen to twenty plow bottoms, but it will make a finished job of seed-bed making at one passage over the land.

Another potential post-war innovation in farming methods will call for larger power plants, that is, an increase in sub-soil tillage as a means of water and fertility conservation of flood control. It certainly will take big tractors, true giants of the land, to pull implements ripping up the land three feet deep. The size of a farm is doubled when its productive topsoil is twice as deep. The "mole" or "gopher" plow for sub-soil drainage, the bulldozer and tree-cutting tractor saw in land reclamation, all call for weight and power.

Multi-motored Units

Some of the designers of the new giants of the fields will borrow ideas from transportation and aviation and solve their problems—not by putting bigger engines in their tractors—but by having more of them. We may expect dual—and maybe multiple-engined farm tractors. This may be the practical solution of the problem of uniting economy of operation with reserve power for emergencies—two or more motors, any of which can be used alone or in combination with the others. Dual motored heavy trucks are now in operation, some of the largest industrial tractors are of this design, and possibly the first entrant of the type in the agricultural field, a dual motored tree digger used by nurserymen, all indicate the next revolutionary development in farm power. There is, of course, the alternative idea of having two smaller tractors so designed that they can be united to form one power unit under the control of one operator. This cute idea was used by an Italian manufacturer who, some twenty years ago, produced a two-wheel tractor, two of which could be joined to form one four-wheel drive machine. An inventive Illinois farmer has designed a tandem hitch and control which enables one operator to drive two large tractors, discing up to 80 acres a day.

Pipe-dreams and aircastles these prophecies would have seemed to the pioneers of the prairies—but not today. Certainly the manufacture of agricultural automotives will be one of the most attractive lines to take over the expanded facilities of war material plants. Proof that this is being done is quite evident in the advertising pages of farm magazines and in the exhibits at recent shows.

CORRECTION: COWS DO WELL ON TIMOTHY

In the publishing business, the editor's cardinal sin is publishing an article without permitting the author to see a galley proof. The editors of Farm Quarterly were guilty of this in an article "Cows Do Well on Timothy', by E. B. Powell, in the Autumn 1946 issue, and we apologize to Mr. Powell and to our readers. Mr. Powell points out that the following corrections should have been made in this article:

Page 52: The protein conten· o! timothy is highest when it is mature. "The word *mature* should have been *immature.*"

Page 53: According to Morrison, this 1200 lb. cow producing 35 pounds of milk daily should receive each day for body maintenance and milk production 2.4 lbs. of digestible nutrients. "The 2.4 should be 2.48."

Page 55: Usually as the protein of a concentrate is increased, the total digestible nutrients increase, etc. "*Increase* should read *"usually increase."*

Page 52: Carotene, pro Vitamin A, is expensive and difficult to handle in concentrated form. Mr. Powell says, "These concentrates are not expensive and not especially hard to handle."

Page 55: Third paragraph: "The word *timothy* should be preceded by *poor.*"

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KARAKUL SHEEP

(Continued from page 39)

properly fed with supplemental feeds, will practically wean themselves at eight to ten weeks of age, and if already accustomed to eating, will not suffer from weaning.

Karakul Lamb Record

After the farmer gets his first pelts from the lambs, he should go to a fur market and get an appraisal of his furs. He should then preserve for future reference representative pelts of different classes and price levels. In this manner, he will have a knowledge in judging his future lambs as to the size of curls, tightness, luster, pattern, and over-all quality.

When a lamb is born the farmer can compare it directly with the scoring standards of his representative pelts and the values can be entered on his filing card. This information should be compiled not later than the second day after the lamb is born because of the rapid changes in growth by the fourth day.

Classes of Fur

The Karakul breed of sheep is particularly prized for the production of fur rather than meat. The pelts may be roughly divided into three classes, commercially known as broadtail, Persian and caracul. Of these three classes the broadtail is the most valuable, but the percentage of this type of skin produced in this country is very small.

Broadtail is usually produced by lambs prematurely born, although in rare cases this type of fur is found on lambs born at full fetal development. In the Near East, where mutton is the most popular meat, Karakul raisers sometimes slaughter ewes to obtain the unborn lamb. Tales of caesarian operations are flights of fancy. It is a flat, lightweight fur, with a water-wave pattern which is very lustrous and beautiful. Broadtail skins are used almost entirely for making women's coats.

Persian lamb is a type of skin produced by Karakul lambs. Pelting the first day is recommended. It is necessary for the farmer to watch the lamb carefully, because the curls open rapidly after the fifth day, and while the value increases with the size of skin as long as the curl remains tight, it is essential that the pelt be removed before the quality of the fur is reduced. In some cases this is as late as the tenth day after birth. As far as is known, no artificial means have been developed to increase the curl, or to change the pattern after birth. This type of fur is used in making women's coats and in trimming coats made of other materials.

Caracul is a trade name given to a lustrous, open type of fur, which shows a wavy or moire pattern and is entirely free from close curls. The term "Caracul" means this type of fur and not the Karakul breed of sheep, in spite of the similarity of names and the fact that this fur is produced by lambs of the Karakul

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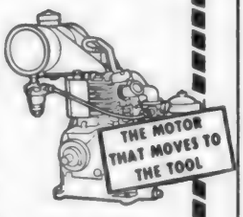

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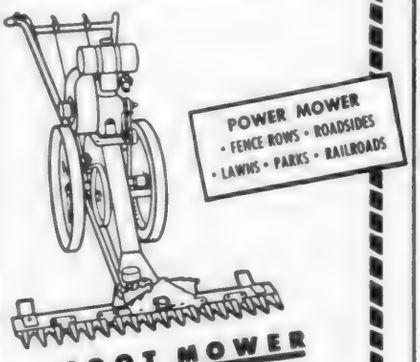

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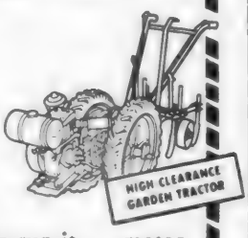

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breed. These skins are light in weight, occurring naturally in black, as well as in various shades of brown and tan. The skins are best removed at an age not greater than two weeks, but they do not deteriorate with age so rapidly as either the broadtail or the Persian type. They can be used for fur as long as the luster remains, which may be as long as two months.

A further classification made by some fur dealers is known as "kinky wool". This is a tight short wool with no pattern. Pelts showing quality between broadtail and Persian are sometimes known as Broadtail Persians.

Size of Curls

An attractive appearance in the finished garment that will be retained in wear is the starting point for judging pelts. The size of curl in demand will vary from year to year. Usually the small curl is most desired for fur coats and the larger curl for trimming cloth coats.

The curls should be smoothly rolled or pencilled, with the tips of the hair closely tucked in against the leather. The curls should be arranged to form a definite pattern, and the more extensive the pattern the more valuable the pelt. There should be a good natural luster that can be enhanced by dyeing, and there should be an over-all silky texture to the pelt.

In contrast are poor pelts with corkscrew shaped curls, shaggy and bunchy curls, and loose, wiry or bristly hairs that make the pelt gritty and harsh and impossible for the building up of luster.

Lambskin Prices

Considerable variation in type and quality of lambskin fur is found in all Karakul flocks, whether purebred or grade. Raw lambskins produced in the United States have brought from 50 cents to $12 per pelt. The average price for choice Persian lamb pelts for several years has been around $10, with the excellent broadtails running up to $25. Recently prices have taken a considerable advance.

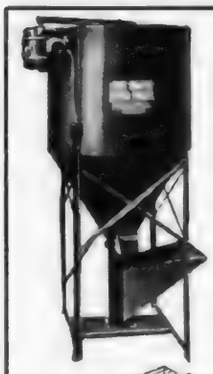
Pelting

No fast rule can be made as to the best time to pelt, although experience has shown that about 90 per cent of the pelts are best taken on the first day of birth. A delay may make a pelt worthless.

The farmer stuns the lamb with a wooden mallet, hangs the lamb up, then opens up the neck and cuts the arteries, and it dies almost painlessly. Another method is the injection of 10 cc of chloroform into the heart hypodermically, causing instant death.

In removing the skin, the skinning knife is inserted at the chin, a slit is made to the brisket, and then up the inside of each leg. The legs are cut off just above the hooves. The belly is then opened from the brisket to the tail joint, and the hind legs are skinned out the same as the front legs.

The tail is then skinned and the whole pelt is brought down to the head and the



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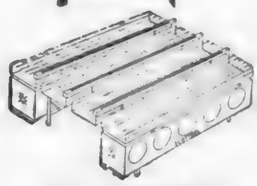

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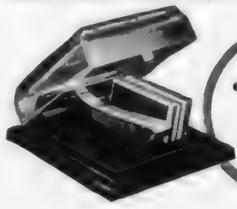


RAZOR and 10 blades in modern case $2.00

eyes, ears and mouth cut out. The whole skin must be taken and nothing should be cut off, as the fur manufacturers usually use the legs, tail and head.

The lamb should be cleansed thoroughly of flesh and fat, washed in clear, lukewarm water, combed or brushed to eliminate dirt or blood, dried out, and finally dipped or rinsed in an arsenic solution.

This solution is made up of one pound of arsenate of soda and one pound of washing soda, dissolved in three gallons of water and then boiled and stirred until thoroughly dissolved. Two gallons of water, in which has been dissolved four ounces of table salt, is then added.

The skins are allowed to stay one minute in this solution, and are ready to be dried. This solution is sufficient for the treatment of 400 to 500 skins. Some breeders use a solution of Cooper's Arsenical Dip.

The use of salts in drying the pelts is not advised, as it makes the skins white and brittle, and the leather often cracks. Nailing up the skins is not recommended, as it stretches the skins too much and leaves them full of holes.

The best method of stretching is to lay the skin on a wooden frame covered with burlap, placing the flesh side on the burlap, to which it will stick because of the natural glue in the hide. The legs are placed forward and backward to give the final dried pelt a rectangular shape, in which form it packs best and offers less danger of breakage. The skins are left on the frames four or five days, or until thoroughly dried, and are then pulled off and stored. Raw skins can be kept almost indefinitely in a cool, dry place and should be protected from moths if not treated with arsenic.

Marketing

When shipping to market, the skins should be placed in pairs, hair to hair, and if a few are to be sent, they should be protected with cardboard. The bundle is then wrapped in paper and sewed in a burlap sack.

Basch & Company, of New York City, tans 80 per cent of the pelts produced in this country. Raw lambskins may be sold directly to fur merchants or raw-fur receiving houses specializing in this commodity, or they may be sent to the auction companies for sale on a commission basis to cooperative associations, or sold through brokers.

Docking

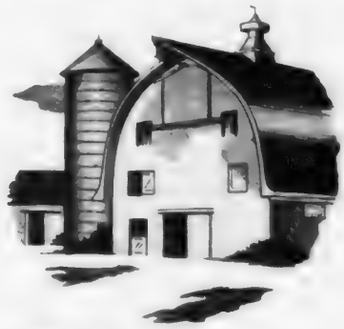
The lambs that are to be kept for breeding should be docked during the first week. Docking adds much to the appearance and cleanliness of the lamb, but is not mandatory.

Docking in purebred herds is being practiced less and less, and then only the little tip is removed. The heavy fat tail is left untouched.

When lambs are raised for market they should be docked very close to the body, and docked very young before the tail has had time to fill with fat.

The Best Thing You Can Say

ABOUT ANY FARM BUILDING



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● You'll get more out of your farm buildings when they are Louden equipped. More production from your livestock through more comfortable, more healthful quarters. More work done in less time with less strain. More profits.

For Louden offers you more original equipment than anybody else, because Louden established the barn equipment industry in 1867, and has pioneered and introduced practically every piece of modern equipment found in America's barns today. It's up-to-the-minute in design, practical and thoroughly time-tested to last.

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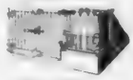
● Louden offers you a complete line of modern barn equipment for every farm building . . . Steel Stalls and Stanchions . . . Water Bowls . . . Feed and Litter Carrier Systems . . . Ventilating Systems . . . Hay Unloading Tools . . . Sliding Door Track . . . Hog House Equipment . . . Horse Stable Fittings . . . And a Complete Barn Plan Service.

We suggest you see your nearest Louden dealer today for it still requires several months to get the equipment you need. If you do not know his name and address, write us.

VENTILATION

DOOR TRACK



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The photographs above tell a picture story of Pioneer's extensive corn research program. Year after year, in the field, in the laboratory, in the greenhouse, Pioneer corn scientists are hard at work developing better Pioneer hybrids. Farmers who plant Pioneer are already benefitting from over a quarter of century of research. They will benefit more in the future because research today means better Pioneer hybrids tomorrow.

PIONEER

DES MOINES, IOWA · PRINCETON, ILL.
TIPTON, IND. · YELLOW SPRINGS, OHIO · MT. JOY, PENN.

For docking, knives, both sharp and dull, chisels, and patented docking irons have been used and recommended. When a sharp-edged tool is used, the pain is slight but there is danger of excessive bleeding. Docking irons which burn through the tail may be used, reducing the loss of blood to a minimum. With any of these instruments the cut should be made about one inch from the body, as measured on the underside of the tail, below the fatty portion.

The lamb should be held with the rump resting upon the top of a panel or pen partition, or upon a board, if hot irons are used. When docking with the hot iron, the operator should work with the right hand, holding the tail in his left hand and pushing it toward the body. This will leave loose skin above the cut to close over the wound. Pine tar, or creosote, cut 50 per cent, may be applied if flies are bad.

Castration

The ram lambs that are not to be pelted or saved for breeding may be castrated at the time they are docked. Both operations should be done early, on a bright, cool morning. In castrating, the lamb is held in the same position as for docking. The hands and knife, or shears, should be disinfected. Unless both testicles can be felt, the operation should be delayed until such time as they can be felt. The lower third of the scrotum should be cut off. The testicles may then be removed by pulling them straight out. Some hardy characters do this with the teeth.

The more scientific method of castrating is with "Burdizzo" type pinchers. These sever the cord to the testicle without breaking the flesh. All types of castrating and docking tools can be obtained from livestock supply houses.

Karakul Wool

The wool from Karakul sheep ranges in length from eight to twelve inches. The average wool clip will run between five and ten pounds, depending on the age of the ewes. Shearing is generally done in late spring or early summer, after lambing.

FENCES FOR EVERY PURPOSE

WOVEN (Domestic) PICKET
Made of half round cedar saplings in two types. In close type pickets are tight together. Cleft has ¼" space between permitting passage of sunlight and air.

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Rusticraft makes the first importation of this famous French fence since 1941! In three heights 4 ft., 5 ft. and 6 ft. 6 in. Two types: Close type and Woven Cleft.

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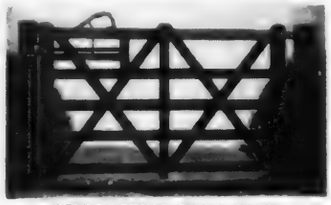

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Rusticraft's famous line of fences and gates will meet your every fencing need. Only the finest of selected timber is used. There is a Rusticraft gate to match each type fence. Prompt Delivery.

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FARM GATES · HORSEBACK AND SELF LOCKING FIELD GATES
CHILDREN'S OUTDOOR PORTABLE PLAY PENS

It should be done on a warm day, so that the ewes are not chilled. The tags or dung locks should be removed from the fleece, and it should then be rolled up, not too tightly, skin side out, and tied with paper twine. The most desirable fleece is free of underwool, with well developed glossy hairs, having a tendency to form into locks on the outer points. A good hair coat parts easily to the skin. Matted and clotted wool brings less money.

Some Karakul raisers shear their flocks twice a year. "If you wait a year the fur gets matted, is too long and won't bring top price," they say.

The wool is used for carpets and rugs, as well as in the manufacture of blankets, automobile robes, mackinaw cloth, and overcoating. The price per pound is about half that for white standard wools.

Dipping

Sheep are dipped to free them of ticks, lice, and other skin parasites. A convenient time for dipping is shortly after shearing, in the spring. The dipping should be done in the morning of a clear, quiet, warm day, so that the sheep will be dry by night and will not catch cold. Every member of the flock should be dipped, and it is well to spray the inside of the sheep barn with dip at this time. There are a number of standard dips sold by feed and farm supply dealers.

To insure the complete eradication of ticks, the sheep should be dipped a second time about twenty-four days after the first dipping to catch the ticks which were not hatched at the first dipping. About ten days should be allowed to elapse after shearing so that shear cuts may have time to heal before dipping.

By-Products

Besides the profits from the sale of pelts, farmers going into the Karakul business should consider, also, the returns from the by-products, such as lambs and milk, for these often make the difference between profit and loss. The milk from the ewe flock can be converted into a feta-type cheese, which sells for $1.50 a pound.

The milk carries cream up to eleven per cent butterfat, is much richer than cow's or goat's milk, though it is homogenized the same as goat's milk, and in that manner differs from cow's milk. The ewes may be milked twice a day. A venture into cheese making from sheep milk requires a lot of spare time and the patience of Job. A good milking sheep produces about a quart of milk a day and the milker must woo each drop from the teat.

On The Dinner Table

Karakul lamb meat is wholesome and quite satisfactory for home consumption. The profits from lambs not suitable for pelting is considerably below that from lambs from other breeds of sheep because the lambs, not being bred for mutton, cut out poorly on the butcher block. However, the prevailing high price for breeding

Cut Feeding costs up to 40%
Beat high overhead expenses by grinding your own Corn, Wheat, Oats and Hay with BELL'S New Modern Hammer-Mill. Remember, it's the money you SAVE in Production costs that determine the Profit you make.
STOCK AND POULTRY
NEED GROUND FEED THE YEAR 'ROUND
1000 lbs. of properly ground feed often produces as much meat or milk as 1250 lbs. of unground feed, and you can save on grinding costs, too! Doyle Allison, Hog Breeder, reports cash savings of $122.50 in 60 days. R. W. MacGregor saves $18.50 in grinding cost on ten tons of corn and barley. You can grind your own feed for as little as ½ of a cent per hundred pounds, with a
BELL'S NEW MODERN HAMMER-MILL
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We are offering a great lot of Corriedale and Southdown rams. Corriedales sired by 52B, the $3500.00 ram. Southdowns by Top Notch and Imp Longfellow, two of the greatest rams of the breed. Ewes of both breeds for fall delivery.

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DAY-OLD and STARTED POULTS

N. Y.-U. S. Approved and Pullorum Clean

BROAD BREASTED BRONZE AND WHITE HOLLANDS . . .

Big, plump, healthy poults that will live and grow. All breeders raised on Ladino range. N. Y.-U. S. Approved—Pullorum Clean under National Turkey Improvement Plan.

Poults, Day-Old to 10 Weeks

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Visitors Invited.
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Box 57 Port Jefferson Sta., N. Y.

BANNER HYBRIDS

High yielding—early maturing hybrids. Adapted to wide variety of soils. Write today for Catalog.

SCHUMACHER SEED CO., BREMEN, IND.

stock cuts down the percentage of lambs which are sold for meat. Karakuls are primarily a fur bearing animal and should be bred and raised for fur. Other breeds produce better lambs, both in weight and conformation, for the meat markets.

Caution

Karakul sheep were among the first introduced into this country (twenty years before Corriedales) but have shown no such popularity. There's a reason for this. Far too many Karakul breeders are engaged in producing breeding stock rather than pelts and the industry has been plagued from the first by exploiters. The industry needs a strong dose of integrity, for there's nothing wrong with the Karakuls themselves.

Since the establishment of its Karakul flock at Beltsville, Md., in 1928, the Federal Bureau of Animal Industry has done extensive research in selective breeding for the improvement of fur. Extensive experiments have also been carried on in cross breeding. The Bureau experts say the high prices for breeding stock and the moderate to low prices for the average lambskin is the primary factor retarding the Karakul breeding business.

CIVILIZATION lost more than it knows when the automobile replaced the horse and concrete replaced the planks of the old wooden bridges. It lost the power to stop, to pause, to loiter, and to enjoy a moment that is being ground between the millstones of yesterday and tomorrow. Some of the romance is gone, too, for in the horse and buggy days each plank in the bridge was legal tender for a kiss from your best girl and old Dobbin knew the fine art of keeping a secret.

Some horses seemed to be in cahoots with the moon, the apple blossoms and the soft spring air. As they clumped onto a covered bridge they slowed down to a walk and then finally came to a stop. It was no trouble at all to start Nell on her way again. A soft clucking sound would do it, if you were in a hurry, which was seldom the case in those days.

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This is how the farm-size SEAMAN ROTARY TILLER actually "crop-conditions" your seedbed for more profitable yields:

. . . Increases nitrogen through soil aeration.
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. . . Helps to reduce soil erosion.
. . . Promotes earlier and more complete germination of seed by maintaining higher temperatures in seedbed.
. . . Enables you to get on land sooner and get crops in while weather is right

Let us tell you about the many new improvements in the construction and operation of SEAMAN TILLERS. There is a size to fit your farm and your tractor . . . 36-inch to 72-inch, power-take-off and motorized models. SEE YOUR LOCAL IMPLEMENT DEALER and write for literature today!

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BULBS 4 FOR $1.00
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SEEDSMEN SINCE 1818
BRECK'S 721 BRECK BLDG. BOSTON 9, MASS.

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Use the right DOW WEED KILLER

2-4 Dow Weed Killer

Low cost. Highly recommended for killing broad-leaved weeds in rice, sugar cane, corn, pastures, fence rows, ditch banks and in small grains where legumes are not interplanted. Does not kill common grasses. Available both as a liquid and a powder.

Esteron 44—a powerful 2-4 D Weed Killer

Useful against many types of woody plants, such as wild rose, poison ivy, mesquite and sprouts of many other woody species. Ideal for use on cut-over and range land.

Dow Selective Weed Killer

Kills or effectively checks growth of many annual weeds, in small grains where legumes are interplanted. Especially useful for flax and peas.

Dow Contact Weed Killer

"Chemical Mower" for weeds along canals, ditch banks, fences, roads. Kills most annuals completely. Destroys weeds, grass above ground, leaves roots to prevent soil erosion.

The good news is spreading from farm to farm: Dow's *chemical* Weed Killers keep the weeds down—help produce bigger crops with far less work! Now—instead of cultivating each field over and over—just spray the right Dow Weed Killer! The weeds absorb the chemical and wither away—the crops flourish! No more mowing and digging weeds in the hot sun! Your neighbors who have tried it (and your county agent) will tell you: Spraying weeds to death is *easy—practical—economical!* Ask your dealer—or write direct.

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FIELD NOTES

"ARTIFICIAL FROST" BETTERS POTATO CROP

Many potato growers harvested better crops last year through the use of Dowspray 66 Improved—containing a very active toxicant which acts as an "artificial frost." It kills vines and weed top growth in 1 to 3 days, allowing normal ripening and permitting early, easier digging. Growers who used this spray reported less loss from blight in storage and the elimination of off-type growths. Seed growers use it to control seed stock, by killing vines as soon as tubers reach the desired size.

NEW SEED PROTECTANT FOR COTTONSEED AND PEANUTS

Featuring Zinc Trichlorophenate as its major ingredient, the recently announced Dow 9-B Seed Protectant is finding ready acceptance with cotton growers and ginners. Earlier planting, better stands and bigger yields per acre (from less seed) were obtained during three years of preliminary testing in the Inter-State Cooperative Cottonseed Plantings. This is the first of many seed protectants being developed through the agricultural chemical research facilities of The Dow Chemical Company.

DDT CREDITED WITH INCREASED BEEF PRODUCTION

DDT is credited with adding valuable pounds to United States beef and milk production. By controlling flies, lice and ticks on beef and dairy cattle, gains of from 30 to 60 pounds of beef per head were reported recently. Present recommendations are a minimum of 4 pounds of Dow DDT 50% Wettable Powder in 100 gallons of water. Used in a power sprayer at the maximum rate of 2 quarts per mature animal, this formulation is sufficient to give excellent protection for 2 or 3 weeks. The addition of underline spraying is reported to increase protection as much as a week. Livestock growers are also spraying barns and sheds.

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PEDIGREED R.O.P. (Record of Performance)

FARM FLOCKS $450

100 pullets, 8 unrelated cockerels, delivery around June 1, birds ready for range—will start making money in early fall when egg prices are higher.

We operate an approved hatching and breeding farm specializing in pedigreed New Hampshires. Flocks tested and clean under Kentucky-U. S. Approved Pullorum Passed Class. True to type and color, healthy and vigorous. Every bird bred for large starting egg size and high egg yield, fast growth and early maturity, large body size, fast feathering, good fleshing quality. Also, R. O. P. baby chicks and R. O. P. hatching eggs. Write for catalog, more information or send check.

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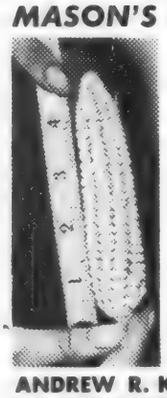

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Letters

(Continued from page 10)

500 ACRES OF STRING BEANS

Sir:

Though mainly interested in canning stringbeans, I grow about 500 acres of stringbeans and 200 acres of lima beans each, I would naturally be quite interested in any articles on either of these crops, or any truck crop for that matter. Am intensely interested in soil improvement and maintenance of fertility, and would like an article related to same, such as "Plowman's Folly" or "How Deep to Plow" (which attracted my attention to your publication) or incorporation of humus, soil improving cover crops, such as clover, etc.

I'm interested in new ideas such as airplane seeding.

George H. Draper, 3rd,
R. D. 1,
Magnolia, Dela.

STONE CRUSHER FOR A NEIGHBOR

Sir:

I own a farm in Montgomery County, Ohio (County seat, Dayton, Ohio). On this farm I have picked a building site for my home and have gone to some expense, having a well drilled, trees planted, etc. Recently a contractor has bought the farm adjoining and contemplates installing a stone crusher of considerable size. This crusher will be stationed, at least for the first year or so, within 400 feeet of my building site. Please advise if there is a law to protect my interests.

Mr. B. M. Wilgus,
26 Marie Ave.,
Dayton 5, Ohio.

There is no statute which would prevent the installing of a stone crusher near your farm property. Your only chance for relief is to prove that the stone crusher constitutes a nuisance.

"The manufacture of monuments, tomb stones and other marble, granite, and stone products in a residential neighborhood, which produces loud noises and varying quantities of fine marble and granite dust which are constantly being blown over, upon and into adjoining property, causing physical discomfort to, and constitute a menace to the health of, persons of ordinary health and sensibility, as well as rendering comfortable enjoyment of their premises utterly impossible, constitutes a nuisance, and even though the business be lawful, equity will grant injunctive relief against it, or a court of law will allow damage therefor." (30 O. Jur. Section 70, Page 346).

When the question of nuisance arises, it must be considered in connection with the locality and the nature of the business involved or the purpose of the property producing it, as well as the time during which it exists and its intensity and effect. In its final analysis each case must stand by itself and be determined by a jury with reference to the circumstances peculiar to it.—Ed.

PICTURE BOOK ?

Sir:

Here in the east people are moving from the cities and while working in the cities and commuting, are building homes in the country. They have an acre or two and intend in a small way to raise a great deal of their own food. Try to keep these people in mind and give them a practical article on the subjects that interest them.

A further suggestion. Have your colored pictures that are general in scope bound into a book form at the end of a year or two.

Rev. George C. Vogt,
Rural Life Director of the Diocese,
321 Lake Avenue,
Rochester, N. Y.

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ABSOLUTELY NO EXPERIENCE REQUIRED. Just a few minutes daily in a few feet of back-yard space. Several females and one male starts a large herd which will furnish you an independent income for years to come

WE FURNISH ALL INSTRUCTIONS ABSOLUTELY FREE

Tremendous demand for breeding stock, delicious meat and world's most beautiful rabbit fur. Brokers, cut off from imported rabbit pelts for years to come, must have these Chin-Chin furs now and for years to come.

Write for free, beautifully illustrated folder today. The advantages of this new business will amaze you!

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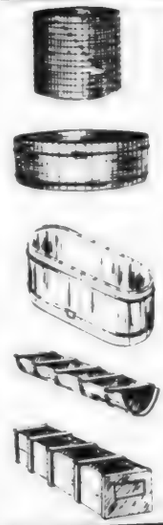

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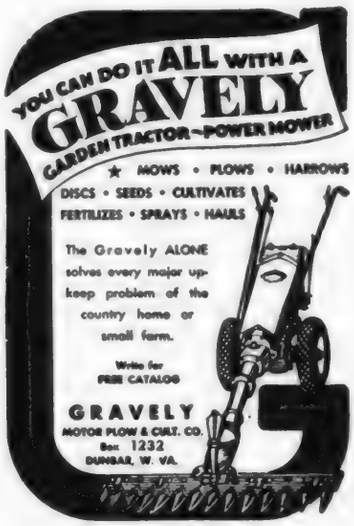
Cut out and attach to postcard with name and address, to

POULTRY ADVISORY SERVICE
Room 120, 1046 South Olive St., Los Angeles 15, Calif.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Farm Quarterly, Cincinnati 10, Ohio

YOU'RE ALWAYS WELCOME, CLEM

Sir:

Your last issue is excellent; just what we have been needing—any by "we" I refer to us who are neither gentlemen nor farmers, but live in the country because we like it, but are forced to make things pay as we go.

I am raising sheep on the glacial hills of this section and your article on permanent pastures coincided with and supplemented my experience. The information on Korean lespedeza was helpful.

Farmers, I observe, need more information on these new crops . . . specific data on planting methods, culture, results. Details on Sericea would be helpful; on millet hay for feed; rape; kudzu. Farmers need these diversified crops but are timid and ignorant about them.

Don't go overboard on the subject of dairying. Dairy men have scores of magazines. It's we miscellaneous croppers who flounder without any help.

How about a summary of the subject of fencing some time; snake rail, pole and post, stake and rider, board, paling, as well as the well advertised wire fences. Wire fences are often so ungodly cleaned up along that friendly birds and rodents haven't got a chance. Not that I'm sentimental about rodents but their burrows do water the subsoil and a flock of birds is worth six poison sprayings and produces non-toxic apples to boot.

But here I'm trying to edit your magazine, where I'd thought only to subscribe.

Good luck!

Clem D. Easly,
Route 2,
Bristol, Ind.

CASON CALLOWAY'S GEORGIA

Sir:

My absorbing interest in farming is watching what results are being achieved by applying modern scientific principles of soil conservation and crop rotation to the so-called worn-out soils of the old cotton plantations in Georgia.

Groups of business and professional men of the state who, under the tutelage of Cason Calloway, are developing 100 or more of these farms at the present time with results that would provide some mighty interesting Quarterly material.

This movement is probably doing more than any other one thing to re-sell Georgians on the possibilities of Georgia lands and to prove to the world that all these lands ask for is a fighting chance to show what they can really do under proper management.

Fred L. Foster,
Palmetto, Georgia.

COUNTRY BOY RETURNS

Sir:

The Farm Quarterly meets a need long unsupplied and I thank you for it.

When I was a kid on the farm our folks said the land was poor "you can't raise a fuss on it". This picture of agriculture led to my casting my eyes toward the city for my future.

But, as a kid, I saw that our soil was so poor because our beautiful hills were washing to the valleys and our valleys into the ocean. I decided that I would go to the city and grow rich and put the whole thing back to grass and woods and put cattle on a thousand hills. I didn't fulfill all the dream, but in a small way I am interested in soil restoration and returning farm land back to fertility. Your treatment of contour planning and fence rows and ponds and pigeons are what I would have asked for.

In addition, I should like to see some stuff about chemurgy. The men reading your magazine have the imagination and the money.

Wishing you the very best and assuring you that I wouldn't be without Farm Quarterly at twice that price.

L. A. Johnson
Chicago 49, Illinois
President, Asso. Short Line Railroads

REPAIRS HITCH IN 15 MINUTES

Costly delays due to broken equipment have been eliminated here. The farmer welded the hitch shown in 15 minutes. He welds all breaks in a jiffy . . . also builds special equipment and hard-faces worn parts easily with his "Fleet-Arc Jr." . . . the new Lincoln Farm Welder with the sensational "Arc Booster". Makes arc striking as simple as striking a match on a hot stove. Easy to hold arc in all positions. Range 20 to 180 amps. with "dial tuning" control—no plugs or taps. Meets power company and REA requirements. *Write for free Bul. 365 today.*

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The next time you're near your favorite garden equipment dealer's store, ask to see the complete Dandy Boy line. In addition to combination seeders and cultivators, there are home garden planters, seed casters, single and double wheel hoes, easy garden mulchers, high wheel cultivators, Krust Busters, and lawn spreaders — implements engineered to do a professional job the easy way.

These Dandy Boy implements are designed to simplify garden jobs and to allow garden enthusiasts to enjoy their hobby of working in the garden. Dandy Boy implements are easy running! They're built by practical garden implement engineers for the comfort and convenience of the user. They're sturdy and strong to deliver years of faithful service. A modest price puts Dandy Boy implements within the means of all gardeners.

So, to get more fun from gardening without the drudgery, investigate Dandy Boy farm and garden implements. Dandy Boy farm and garden implements are sold in the better hardware or implement stores. Write us for our 1947 Dandy Boy booklet. It's free.

FREE booklet on request

THE **MIDLAND** CO.
SOUTH MILWAUKEE, WISCONSIN

DANDY BOY IMPLEMENTS

FIVE STAR FARM

(Continued from page 102)

and if we take that figure for both periods, we find that his income per acre during the pre-clinical period was $23.40 while during the clinical period it was $42.87. Because of the large amount of grass pasturing in the program Henderson was able to reduce his labor hours by 33⅓%.

Continues Long, "We kept our promise to Henderson in that we told him we would improve both his soil and his bank account. Since this time we have made up a second five-year program for this farm.

"We must admit that the results were surprising to us," said Long, "we had no idea in the beginning that we could take the best farms in the state and increase their profit more than a small percent. However, out of 43 we have investigated only two farms that were not being depleted in soil fertility. Another astonishing conclusion drawn from the records of farms we are working with is that even the best land in Indiana can be made to produce greater profit from grass than from corn. A few weeks ago Henderson & Smith told me they would plant very little corn next year, although on a per acre basis this year the farm is producing twice as much as it did eight years ago."

Tomorrow—Farm Clinics

Were Long a younger man he might now be planning a chain of "Farm Clinic" offices all through the middle west, but this he is leaving to the younger men who are associated with him. Right now he has his hands full taking care of the farms in his home state of Indiana. He feels that the time is not too far off when every well-managed farm will have a plan of operation for several years ahead with a goal of improved soil fertility and better profits. When that day arrives he may want to slow down and relax a bit, but he most likely won't.

To Owners of Herds

Carefully conducted experiments have proved that the elements Iodine, Iron, Copper and Cobalt play a controlling part in animal nutrition. All domestic animals, forced to subsist upon foodstuff grown in iodine deficient soils, are subject to many diseases traceable to that deficiency.

PREGNANCY AND LACTATION CREATE HEAVY IODINE DEMANDS. The demands on the calcium and phosphorous resources of heavy milkers is enormous—almost unbelievable— and, essential as it is to maintain the supply of these minerals in their feed, it is still more necessary that the animal be supplied with iodine, which promotes their retention.

THE IODINE IN IODAL WILL HELP YOU TO FEED OUT DISEASE — YOU CANNOT BREED IT OUT. Pure breds and heavy milkers are the prey of abortion and tuberculosis.

The economic production of beef, pork and mutton, of milk and eggs, demands rapid growth and early maturity. Experiments designed to measure the influence of iodine on the absorption of nitrogen, phosphorous and calcium — which are the very basis of growth—proved that better growth was induced almost immediately by the introduction of iodine into the ration.

We hear of sex-precocity, which means the early maturity and quick turn-over of animals. Nobody wants slow-maturing animals these days. Iodine causes rapid development of the body and naturally the sex-organs also develop rapidly. No breeder should be afraid of his animals reaching the age of puberty a month or two earlier than is considered normal.

Don't confuse Iodal, which is an organically combined iodine, with potassium iodide, which is a drug.

Our literature elaborates the points raised here.

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We have sons and grandsons available, but no females as we are in process of doubling our herd. We will direct you to breeders who can spare a few females.

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G. N. SLADE, Owner
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Popular and picturesque fence, surprisingly strong, and much used by farmers and country home owners as a friendly boundary and garden background for vines, roses and other plants. Also used where fox hunting and steeplechasing are enjoyed. Four, five and six bar styles. In sections 8' 3" long and stands four feet from ground when erected. Post ends creosoted.

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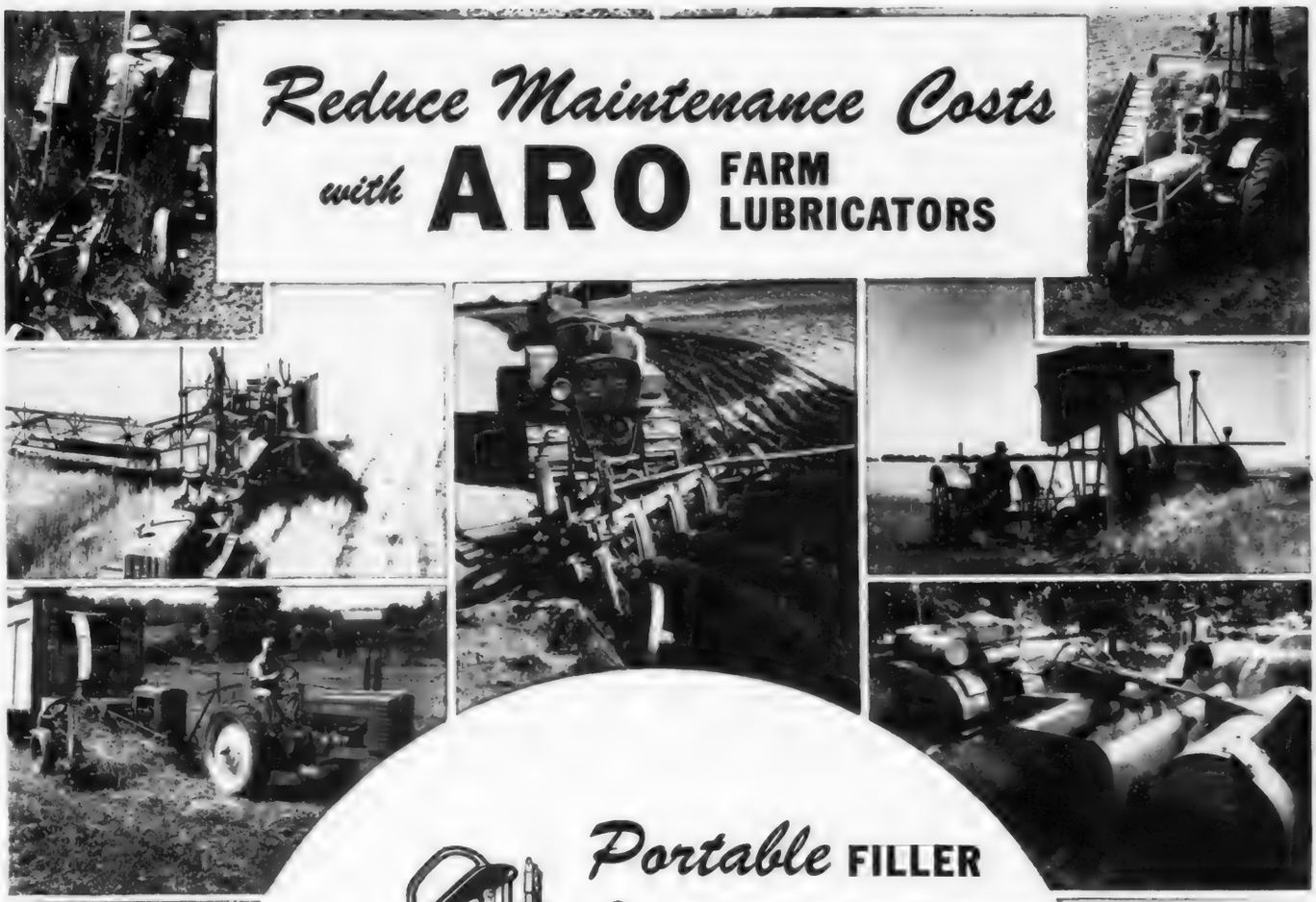

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LEFT... New Hand-Operated Model 2130 Lubricator. 30-lb. capacity. Develops 5000 lb. pressure with ease. Light weight.

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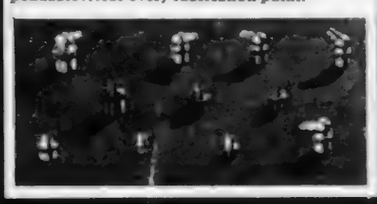

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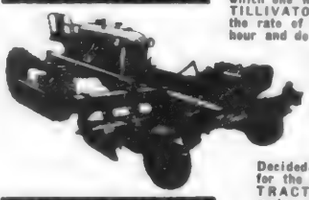

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ARIENS COMPANY
BRILLION WISCONSIN

AUTHORS IN THIS ISSUE

GEORGE E. JONES, author of the article "Karakul Sheep" lives in California where he has watched the Karakul sheep ranches grow into a big business. Mr. Jones hails from the east, having been a steel worker in several of Pennsylvania's steel-town open-hearth furnaces. Just to stay in the same kind of atmosphere he settled in Indio, California, which, in case you haven't been there, is warm enough to grow the best dates in this country — and that's warm.

Sheep experts who helped edit this article and lard into it helpful information were: L. K. Brown, Secretary of the Karakul Fur Sheep Registry Association, Messrs. Spencer and Kellogg of the U.S.D.A. and Larry K. Bear.

GEORGE E. LAYCOCK, who wrote the "Immaculate Pig" and "Alfalfa on the Hillside" articles, is a graduate of the Agricultural School at Ohio State University. He knows the hills whereof he writes in the alfalfa story, for he grew up in southern Ohio. He had to scramble up and down the same hills to get to the two-room brick schoolhouse, where he started his education. He was in the Army following his Junior Year at the University and observed agriculture in Europe at Uncle Sam's expense. Since returning to college, following the war, he has written extensively about farm subjects and edited the Agricultural College Magazine.

J. F. WALKER, who wrote "Practical Livestock Breeding" is an authority on sheep and livestock of all kinds. At the request of the U. S. government he studied various types of sheep in Australia, New Zealand and Europe in 1926-27. "Jap" Walker, as he is known to stockmen, started out in life as a school book salesman, but his heart was in farming, and he soon gave up selling textbooks and started keeping herd-books. To tell the story of the breeding of the "Blue Grass Lambs" FARM QUARTERLY asked Richard C. Miller, sheep specialist at the University of Kentucky to collaborate with Walker. The result is a success story of a farmer who knew what the market wanted and bred to supply it.

VIRGIL OVERHOLT is Extension Agricultural Engineer at Ohio State University. Early in life he got acquainted with the problem of draining farms in the black swamp land of northwestern Ohio. He created the much reprinted "Water For Thirsty Farms" pond article in FARM QUARTERLY Spring, 1946. Overholt is a graduate of Wisconsin, and water control problems have been his dish since he left school. In this issue he wrote "Farm Drainage."

FRANK H. BEACH is the extension horticulturist at Ohio State University and the operator of a large fruit orchard in southern Ohio. The apples he raises are all the recommendation that any fruit grower needs to be sure of Beach's ability and knowledge in the orchard. His story "Fruit on the Bough" is the first in a series of "how-to-do-it" picture stories giving a step-by-step, picture-by-picture guide to fruit growing. Says Beach, "I feel most literature on fruit tree planting and pruning is long on words and theories, but short on pictures showing how to do it. What I have tried to do is give the fruit tree story in such a way that a copy of FARM QUARTERLY could be put on the ground and the trees planted by checking with the pictures for each step."

T. A. KIESSELBACH, who wrote the article, "Oats" is professor of Agronomy at the University of Nebraska. He has been in charge of crop research in the College of Agriculture since 1911. His original studies of crops would fill a small library. Prof. Kiesselbach has made notable contribution to agricultural knowledge in his work on corn, soybeans, wheat, oats, barley, alfalfa, sweet clover and other forage crops.

ARCHER P. WHALLON'S story "There Were Giants in Those Days" is a result of his extensive agricultural research. Whallon is developing his mate-

(Continued on page 125)

Today a better SUPER SIX for less

Constructing student parking lot at large midwestern agricultural college

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MINNEAPOLIS 2, MINNESOTA

DEPARTMENT OF GREAT DELICACY

"MORE THAN GOOD CLEAN FUN."

Sir:

When I bought a farm 12 years ago, I wrote to our State university and to the Department of Agriculture for booklets covering the farm subjects that interested me: soy beans and peanuts. What I got back almost made me sell the farm because I thought I could never learn to understand what it was all about.

Your take-off on these bulletins in your article about the HORN ELEVATION is more than good, clean fun. It has a serious undercurrent and is, (whether you intended it or not), a powerful criticism of the bulletin writers who are supposed to help us but who really only try to find some tiny point which no one explored before so that THEY, TOO, can publish a farm bulletin. Farm bulletins should be published to help farmers, not to give a government or college professor an excuse for a publication with his name on it.

Walker Striker,
Kansas City, Mo

WE GET THE STRANGEST LETTERS

Sir:

Your article, current issue, absolutely intrigues me. Intrigues, that is! "A Study of Cumulative Results in Dairy Improvement on Maine Farms by Horn Elevation."

If you would be generous enough to pass the experience I relate to the Dear Doctor Gould, I feel it may in some way be helpful. As a boy I well remember an Ayrshire on my grandfather's farm that had very long, low horns. I believe she, too, was Lulu. Well, my Uncle Ez used to get mixed up in these horns now and again until he came across a special bone solvent at the local fair one year. Lulu wasn't a bad milker before but when Ez got done with her there was no holding her. In fact, Uncle Ez passed on because of her. Almost, that is.

The instructions on the bottle said, "bore a hole about ⅛ in. close to the end of the horn, then with a syringe fill the horn cavity with the liquid." Well, in twenty-four hours the horns had become so limp that Uncle Ez could cross them, and I can still remember seeing him tie fancy red ribbons with wide bows at the place where the rubber-like horns crossed.

Everything went all right for quite a spell. Lulu kept giving more and more milk until at last grandpa decided to buy one of those new milking machines to cut down Ez's increased work. Well, it came on a very rainy spell and the creek in front of the barn got higher and higher. Ez had the machine goin' on Lulu one night when he thought he'd go out and see if the water had gone over the bank. Sure enough it had.

While he was away the machine had gone on and on grinding tons and tons of milk out of old Lulu, so that when Ez opened the door to enter the barn an avalanche of milk, head high, tossed him off his feet on its mad rush to join the stream. Well, before anyone knew what happened to Ez he was a mile down the stream scratching like mad to get up the bank.

Need I tell you that that was the end of all horn treatment the rest of grandpa's life.

Somehow I have always disliked myself for never having given this event to science before. I hope Dr. Gould is careful.

Michael Frye,
Gale House Farm,
R. D. Pennsburg,
Bucks Co., Pa.

RELIEVES THE STRAIN

Sir:

When Irving Deschauer wrote you the letter published in your winter issue congratulating you on publishing a strictly farming-business magazine, he spoke a little too soon. I consider your article and letters on horn elevation to be masterpieces. My first thought (I read the letters first) was, here is something new that requires careful reading. I started again . . . becoming more confused the farther I got. I wondered if I was crazy or just nuts. Finally it dawned upon me what it was, and from then on I enjoyed myself. I also enjoyed the second reading.

I am filing the article with its companion piece, the article on the turbo-encabulator which appeared in Time Magazine about a year ago. Thank you for lightening the strain of living.

G. E. Bentley,
R. D. 1,
Jamestown, N. Y.

THE LAY SCIENTIST

Sir:

The article on horn elevation on dairy cattle in the Winter issue of your magazine is very entertaining to me because I have carried on a similar experiment with much more startling results.

I did not go to the trouble of removing the horns. To be sure I was on the right track I started with a calf, as soon as the horns were long enough I placed a rubber band around them so that it would tend to pull the tips together. As the horns grew longer and larger another rubber band was added, etc., until at maturity the angle of lift had passed the 180 degree mark by about 10 degrees.

Believe it or not within 4 weeks from freshening this animal was producing so much milk that I was forced to remove it to the second story and install under it a 3 foot funnel and pipe the milk to a barrel which had to be emptied three times daily.

My experiment is much more startling than the one conducted by Prof. Gould of theUniversity of Lisbon, because I started the experiment with a bull calf.

M. C. Palmer,
R. D. 5,
Rochester 10, N. Y.

Probably one of those new hybrid bulls.—Ed.

THANKS

Sir:

CONGRATULATIONS YOUR GAG STORY HORN ELEVATION. D. U. DUNCAN, CHICAGO, ILL.

ON YOUR TOES, MEN OF CORNELL

Sir:

I have just read with intense interest your stimulating paper on "Horn Elevation" which appeared in the December, 1946 issue of The Farm Quarterly pp. 78-79. Such an outstanding discovery promises to revolutionize the entire dairy industry.

If available, I would very much appreciate having several reprints of this important paper for distribution among the members of the Dairy Science and Animal Husbandry staff.

Wm. P. Van Eseltine,
Assistant in Bacteriology,
Cornell University, Ithaca, N. Y.

P. S. Congratulations on a job well done!

ERRATA

Sir:

This is in reference to Gould's article (pp. 78-79) in the Winter issue of The Farm Quarterly. . . . Typical of the errors in this article were:

Page 79, Col. 1, Line 2.

1. The correct spelling of the breed of cattle mentioned is Ayrshire not Ayershire.

Page 79, Col. 1, Line 27.

2. 37 gallons of milk is equivalent to 318 pounds. Even with a 2.5% butterfat test (average of Ayrshire breed is 4.08) this is equivalent to 79.5 pounds butterfat or 95 pounds of butter, which may or may not be a small pat of butter. Also, how did Mrs. Plourde keep the milk for five months without undue spoilage? (One quart a day for 148 days is 37 gallons).

Page 79, Col. 1, Line 38.

3. In regard to the diet studies, their study on one animal would seem to dispute the results drawn from scientific experiments on thousands of animals, in the past fifty years.

Page 79, Col. 2.

4. How were the horns replaced so that circulation could be restored or were the stumps merely set on the head with glue and adhesive tape?
5. Which Table II is correct, the one in the photograph showing quarts of milk, or the Table II in the article with pounds of milk?

It would seem strange, if we are to believe Mr. Gould, that dehorned cattle would produce milk at all. Would he care to answer that question? In addition, how would Mr. Gould explain the increase in milk production when the horns were removed and reset?

Wouldn't it be better to have your contributing editors read and approve these feature articles? I am thinking of Dr. G. W. Salisbury of Cornell who has had training in dairy husbandry and physiology.

If farmers are to receive value from reading your journal, then you should be careful to give the reader the viewpoints of recognized authorities in the field of agriculture and not material on which scientific evidence is lacking.

Dr. W. J. Tyler,
Dept. of Dairy Husbandry,
West Virginia University,
Morgantown, W. Va.

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IMPROVED AUTOMATIC
FOR TOWN & COUNTRY

For deep or shallow wells. Backed by 26 years experience. One of famous Wayne line of basic home requirements. Write for literature.

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THE PRECOCIOUS MUTANT

BY HOMER CROY

THIS IS a Picture of Jesse Hiatt and his wife. It was on the Hiatt farm in Iowa that the first Delicious Apple seedling grew. Stark Brothers Nursery propagated the tree and made it the best known apple in the world.

THE part that chance played in the development of the most famous apple in the world took place near Peru, Iowa. I got the story from the daughter of the man who contrived this amazing feat, Mrs. O. D. Silverthorne, Box 8, Route 1, Perris, California, who is still as firm as a winesap.

Her father was Jesse Hiatt—a name that means something in the midwest. At the time of the story he was living on a farm near the Iowa town of Peru. He had a cider-press, where he made cider for himself and sometimes "accommodated" his neighbors. When he was through "pressing", he would dump out the seeds.

One spring he noticed that a seedling sprout had come up. He cut it down. But the next spring it was up again. He said, "I guess if it's that anxious to live, I'll let it."

The decision turned out to be a lucky one; in fact, it made the old gentleman famous.

The sprout grew into a tree and at last the tree bore—dramatically—one apple. Jesse Hiatt sank a tooth and got a surprise; it was the best he'd ever tasted.

He said he believed it came from the stump of a Bellflower which he supposed was dead, but it seems he was wrong. Scientists, who have studied the whole thing, say it was a "seedling." In case you're not up on seedlings, a seedling comes from a seed. That is, a seed can be planted and, after nature has whispered to it, the seed becomes a tree. (Remember how Johnny Appleseed went through Ohio with a bag of apple seeds over his shoulder?) He would stomp a hole in the ground with his boot heel, drop some seeds and mosey on again. Seedlings came up.

But when a stump sends up a junior, well that's a sprout. But a sprout isn't so good; it's not so vigorous and has fainting fits. If it ever does bear, the fruit is runty and bitter.

The seedling was probably what the professors call a mutant. It came from a seed in which the chromosome arrangement, which determines the variety, has been disturbed, maybe by a cosmic ray. The seed might have come from a Bellflower or a Pippin or a Maiden Blush. A mutant is a sudden departure from hereditary traits. Sometimes this happens in animals and farmers call them sports.

Jesse Hiatt didn't understand all these learned things; all he knew was that he

(Continued on page 126)

Authors In This Issue

(Continued from page 122)

rial on experimental gardening in both domestic and foreign crops. He has had to go through a great many foreign publications, and this required a reading knowledge of a number of languages. To date he has succeeded in picking up French, German, and Spanish. He has a lot of reading to do in Russian just now, so that's his present study. "Russian is the toughest language I've tackled," he says. Whallon feels that American farmers and gardeners do not appreciate foreign crops which grow well in this country. He lists kale, chufas, mung beans, sunflower seeds, roselle and roquette as good possibilities.

KARL MASLOWSKI is a Georgia born naturalist without a southern accent. His article "The Flying Rat Trap" gives a new angle to the eating habits of the great white barn owl, a favorite shotgun target for farm boys for a good many years. Most of Maslowski's life has been spent in the mountains and forests of the northwest, the deserts of the southwest, on the glistening islands and the blue waters of the Gulf of Mexico, or in the hills and flat plains of the middlewest.

HOMER CROY is best known as a humorist, although his article about the Delicious Apple in this issue of FARM QUARTERLY is fact, not fantasy. Croy claims he was "born and reared" near Marysville, Missouri. He says: "I still own the farm . . . would anybody like to buy a farm?" In his book *"Country Cured"* he tells of his life on the tiny Missouri farm that his mother and father claimed when their wagon train broke down on the way out west from Ohio. Later he recounts his trials and eventual success as a writer, averaging about $25,000 per year Not bad for an old farm hand.

ADDITION TO "IT'S TIME TO SPREAD PHOSPHATE!"

Charles Krutch, Chief of the Graphic Services, TVA, points out after seeing a first proof of the Spring, 1947 issue that there is an ambiguous sentence in the first paragraph on page 88. The 1000-pound treatment of 20% phosphate and the 1800-pound treatment of triple super-phosphate were the applications to the 10-acre field being discussed. The per acre application would of course be 100 pounds and 180 pounds. Both the Soil Conservation Service and the TVA checked these figures and approved them originally.

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THE PRECOCIOUS MUTANT

(Continued from page 124)

had him a mighty good eatin' apple.

Next year, instead of a lone sentinel, there was an apronful of apples on the tree and Jesse Hiatt's heart thumped like a jaybird's.

The third year the tree really went to town and so did Jesse Hiatt, with the finest apples anybody ever did see. The apples were peculiarly shaped and peculiarly colored. The color was a kind of strawberry roan. The shape oddest of all; on the blossom end were five knobs, each about as big as a baby's knuckle. Ordinarily an apple has a smooth round end, but not this orphan that had suddenly appeared on the plains of Ioway. The old gentleman named the apple "Hawkeye," built a fence around it and cared for it tenderly.

Then Jesse Hiatt hit upon a nice little source of income: county fairs. Among the displays devoted to corn and wheat and mules there was always one given over to apples and other fruits of the farm. The apples were piled on plates, with the name of the grower on a piece of paper under the plate. When judging time came, three learned men would arrive and each take a bite out of an apple; then pass on to the next apple until they found one that set them dancing in the aisle.

Each time Jesse Hiatt entered his apples, he walked off with first prize. The money was pretty handsome for those days, sometimes as much as $20. The honor was tremendous and the old cider-mill operator got to be a man of standing in his community.

He followed fairs like a hound-dog on a coon's trail. Every time there was a fair, there would be old Jesse Hiatt with his beard and his apples. And when the fair was over, he would have a gold eagle in his pocket and a song in his heart. He said, "I'm makin' more off of my apples than I am off my corn."

Came the year 1894.

There was to be a fair at Louisiana, Missouri, and old Jesse Hiatt, of course, sent his apples.

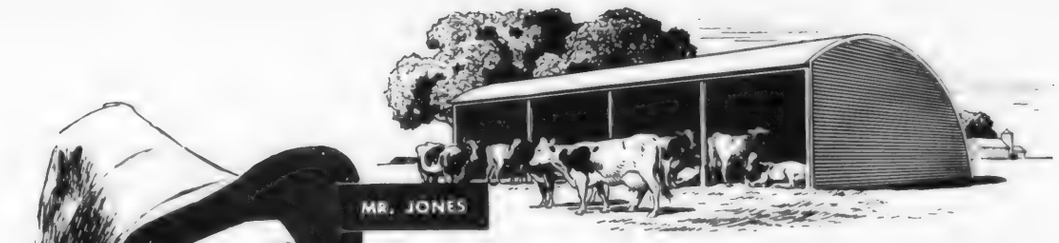
Louisiana was the home of Stark Brothers, a nursery that had been passed down from father to son for eighty years. C. M. Stark, the senior member of the firm, was a judge at the fair and when he tasted one of the Hiatt apples his face lit up like a lantern in a barn. It was the best apple he'd ever come across in his life.

Naturally, as a Stark, he wanted it for his own.

But the piece of paper under the plate had been lost and no man knew whence had come the apple.

Mr. Stark knew there would be an exhibit the following year, so he personally tripled the prize money. Sure enough, the apple turned up, just as he knew it would.

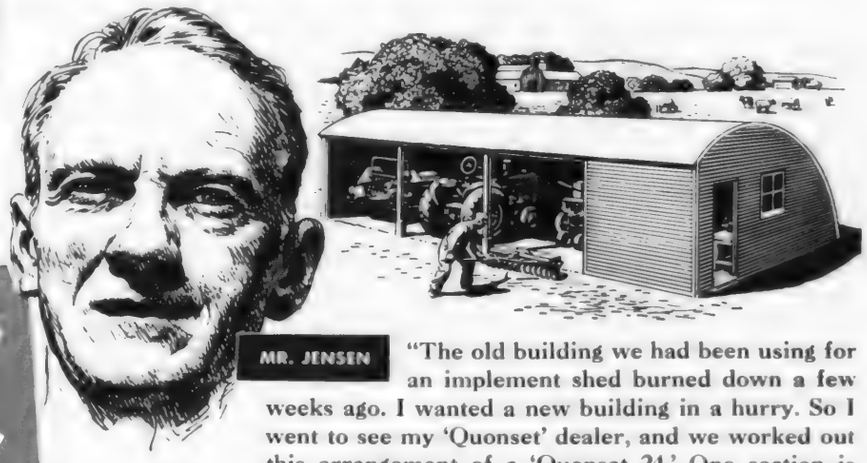
He sent off a letter to Peru, Iowa. Back came an answer in a stiffish hand, for a plow-handle doesn't add to the art of pen-



MR. JONES

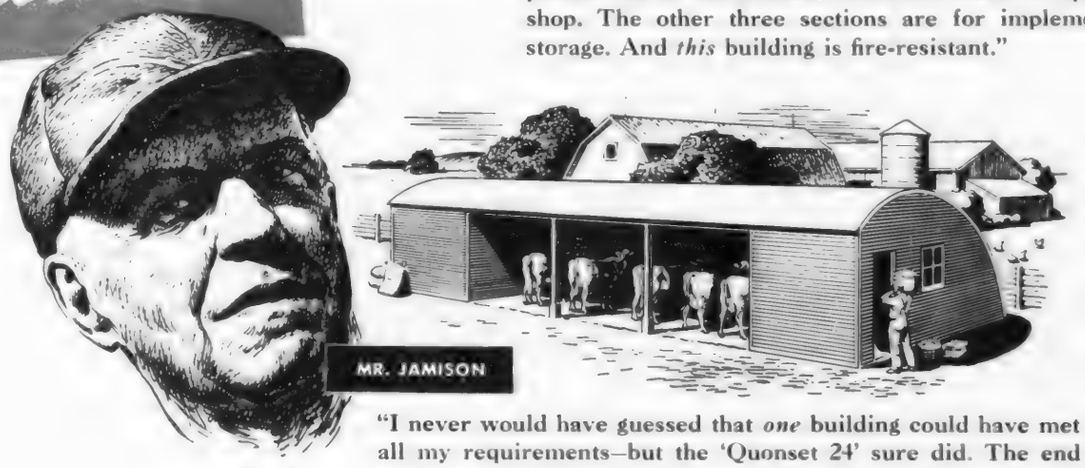
"I was after an open-front building to use as a loafing barn for my livestock. I didn't want to put too much money into it—but I did want a building that would stand up and maintain good appearance. The 'Quonset 24' in its simplest form—open front, no windows—was the perfect answer to my needs."

THREE DIFFERENT WAYS TO LOOK AT THE "Quonset 24"



MR. JENSEN

"The old building we had been using for an implement shed burned down a few weeks ago. I wanted a new building in a hurry. So I went to see my 'Quonset' dealer, and we worked out this arrangement of a 'Quonset 24.' One section is partitioned off and enclosed to use as a machine repair shop. The other three sections are for implement storage. And *this* building is fire-resistant."



MR. JAMISON

"I never would have guessed that *one* building could have met all my requirements—but the 'Quonset 24' sure did. The end section on the right is a freezing storage room for our truck garden—solid front panel, partitioned off, insulated. The next three sections serve as an open-front heifer barn. And the end section on the left is partitioned off as a feed room, with a sliding door for easy access. It's a real step-saver."

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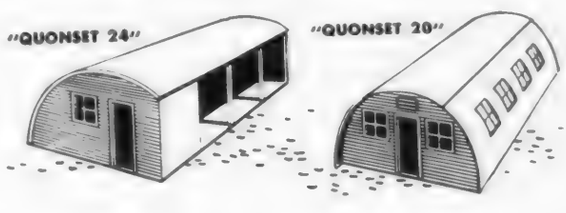

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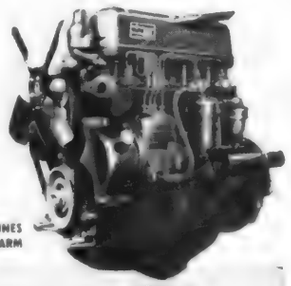

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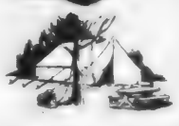


BATTERY CHARGERS

manship. Yes, he had growed the apples, out by the turnip-patch, past the hayrick, said Jesse Hiatt.

Mr. Stark flew like a homing pigeon, straight to Peru and there, with his own eyes, saw the tree. Like Hiatt said, it "happened." All the scientists in the world might never have done the trick. Did the cutting down of the sprout have something to do with it? No one knew. The two looked upon it, like parents upon a new-born child. And something of the mystery of creation entered in upon them, for here was something that had never before existed in all the world and now it was here and smiling at them. Durned if the thing wasn't miraculous.

"Will you sell me the right to propagate it?" asked Mr. Stark.

Jesse Hiatt pulled his beard, "I just don't know, rightly. How much you got in mind to offer?"

"I've got some marketing ideas. Could we work out a royalty arrangement?"

"Likely I'd be interested." His voice filled up; Jesse Hiatt did indeed believe in his apple. "It's a mighty good eatin' fruit. I'd like to see it grown around, wide-spread."

And so they made a deal, the two standing in front of the precocious tree. Stark took some of the sprouts back to Missouri. And on the way he mused. "Must have a suitable name," he said to himself. "Hawkeye is too local."

He carried with him a little red book in which he jotted down, from time to time, names he thought would be suitable for Stark plants. This time he didn't hesitate, for he knew the name he wanted—Delicious. C. M. Stark launched the biggest advertising campaign ever known in apple history. The apple was a success from the start and became the best liked and most famous apple in the world. The year he started to exploit it was 1895; in 1945 the Delicious celebrated its fiftieth birthday with speeches, seemingly, by everybody who had ever tasted one.

There has always been a legend that the Stark Nursery paid Jesse Hiatt $5,000. I tried to verify this from several persons, but got nowhere. I wrote to Mrs. Silverthorne who said the family could have lost the record of it. I suspect if an Iowa farmer got $5,000 for an apple it'd be carved in bronze on the state house grounds.

Recently, I went to see the old tree! The farm has passed from the Hiatt family and is now owned by Raymond E. Tracy, I didn't get to talk to Mr. Tracy, but his sister was there. From the road only one sign indicated that this is the birthplace of the world's most famous apple. On the front of the barn is painted: *Home of the Delicious.* The word "apple" is omitted, but it is not needed, for, in this section, the two mean the same.

I walked past the house about fifty yards where I saw a three-cornered iron fence. And there, in the middle of the plot—no larger than a home kitchen—was the venerable old tree. It stands as high as the ceiling of a room; its bark is gone. The tree itself is filled with cement, like an ancient tooth, and is held together by stays and clamps and bands. And it has been there since it was discovered in 1872, this patriarch, this tree that has meant so much to the apple-eating world.

I thought of the scenes that had taken place here; the Governor had spoken. I had seen a faded photograph of a great crowd around the tree; and here, before me, was the three-cornered fence just as it was in the days of the tree's glory. I felt an immense respect for the old veteran.

There, inside the fence, were growing two sprouts—the tree has amazing vitality. I went back to the house and talked to Mr. Tracy's sister. She said her brother was paid $25 a year by Stark Brothers to let the tree stay.

"How many people a year come to see it?" I asked.

"Three or four," she said.

Why, they should come each Sunday like people to a baseball game.

As I was leaving I turned and looked back at the stiff, straight, barkless bole outlined against the cornfield and I felt a kind of veneration for it, almost as if it were a person who had given his life in good works. And I thought what *chance* had done—or had it?

GOOD FOR LIFE

(Continued from page 21)

of Johns-Manville insulation board (other boards are approximately the same) that is one inch thick would provide 2.78 degrees of resistance to heat. Obviously in this case that would not be enough, and further insulation would have to be provided.

How Much Insulation Do I Need?

Each of the manufacturers of prefabricated metal farm buildings will supply, on request, the given amount of insulation necessary for any of their buildings which are to house a stated number of livestock, and to be protected down to a given temperature. The expense of the insulation depends upon the climate in which the building is erected, the size of the building, and the number and kind of livestock.

The simplest kind of insulation, i.e., insulating board, can be secured in ½", ¾" and 1" thicknesses. These boards can be nailed directly to wood studs and joists.

Such insulating boards are made of wood, cane, or other woody fibers woven and felted together. The insulating value of such board comes from the millions of tiny air cells within and between its fibers. Heat travels very slowly between these air spaces. Each cell helps to slow down the passage of heat through the board. For instance, the effectiveness of insulating board may be compared to the insulation value of ordinary yellow pine wood. A piece of insulating board 1" thick will reduce heat loss by as much as three 1" thick yellow pine boards; or 15" of common brick, or 16" of clay tile, or 36" of concrete.

The kind of insulating board used for nailing against studs in metal farm buildings comes in units 4' wide and up to 12' long; in thicknesses of ½, ¾, and 1".

To slow down the passage of heat still more, rock wool may be placed between the inside wall of the building and the insulation board.

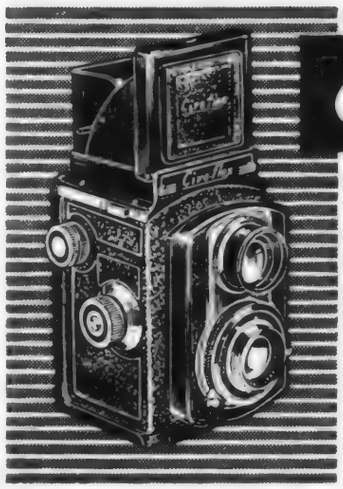
Mineral wool batts and blankets can be secured in various thicknesses up to 3⅝".

When metal buildings are insulated to house animals, the lower six feet of the wall should be covered with any rough boards nailed over the insulating board to stop a well-planted hoof or horn.

If the aluminum foil material is used it should be kept in mind that the reflective surface should always be exposed to an enclosed air space. To secure the greatest insulating value of the aluminum foil the air space should be an inch or more in width. This type of material is generally installed between the studs or joists of the wall or ceiling. In addition to the insulating value this material is also a good vapor barrier.

Vapor barriers, because they prevent condensation within the insulated wall, should always be used with insulation.

Thus the degree of insulation may be



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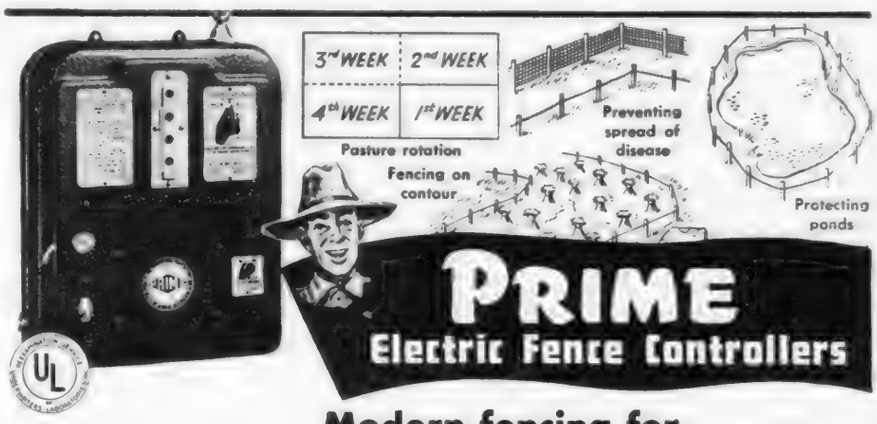

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Saturday, May 31, 1947
This event will be an exhibition and sale at auction of some of the finest of the Jersey Breed, offering a rare opportunity to procure outstanding animals which otherwise could not be acquired. You are cordially invited to attend. Catalogue (when ready) on request to Biltmore Farms.

THIS FARM LAYOUT was engineered by Martin Steel Products from their various pre-fab units. Reading from left to right, we see first a milk room, 12'x20' ($500); a dairy barn with four ventilators on top, 35'x40' ($3,000); a covered passageway leading from the dairy barn ($1,000); and last is a grain storage shed holding 4,000 bushel of grain ($1,700). In the rear are two tall buildings: the one at the left is of course a silo, 12'x30' high ($800); and on the right is a tall haymaker 18' in diameter and 30' high ($1,200). All prices are figured knocked down and delivered. Aside from laying the foundation and the necessary concrete work, the erection costs when bought from the manufacturer are from 10% to 20% of the total cost of the building. To insulate the dairy barn, and add the exhaust fans, as shown in the photograph, add 5% to the knocked down price.

improved by nailing on the inside of the insulating board, a vapor barrier material such as Sisalkraft. This product consists of two sheets of aluminum coated kraft, sealed together with asphalt and reinforced with fibres. This resists air infiltration and prevents the passage of moisture vapor through the wall. It is available through lumber dealers in rolls 36" and 48" wide, at a cost of about $21.00 a thousand square feet.

The final step in reducing condensation is in the installation of thermostat operated exhaust fans which takes out the warm air when the temperature reaches a given point.

How Much is a Barn?

Let's go out into the field and see how The Martin Steel Company insulated their smallest metal dairy barn (35 x 48) which they sold to a Missouri farmer for $4,100 plus another $1,300 for foundation and erection. These two figures include the complete building, sash, door, electric ventilation, insulation of doors, walls and ceiling, and a concrete floor with walls 12 inches high.

The Martin people have their own ideas of how to insulate a prefabricated metal barn. Here's how they do it. On the outside, of course, there is the metal wall. Then comes four inches of dead air. Then, on studs, insulation board one inch thick is tacked. This is a special insulation board, made by several companies which on its outside has a vapor barrier sweated right into the board. After the board is erected, the cracks where the sections are sealed are painted with a DuPont asphalt preparation that seals the cracks. This insulation board wall is separated by one inch of dead air space from a second metal wall. This "sandwich" of metal, four inches of dead air, one inch insulation board, vapor barrier, one inch of dead air and a final metal wall is the end result of Martin Steel's years of metal farm building engineering.

Information Sources

When metal buildings first appeared on the farm the method of anticipating condensation was sheer guess work. Sometimes the metal walls were white washed or sprayed with aluminm paint. Other times studs were put up and plaster boards erected. But in the past thirty years an enormous amount of research has been done and almost all the large insulating companies, such as Johns-Manville, maintain a "district engineer" in their main city offices estimate farm insulation costs.

The National Mineral Wool Association. 1270 Sixth Avenue, New York 20, N. Y., offers information about the use of "rock wool" to prevent condensation.

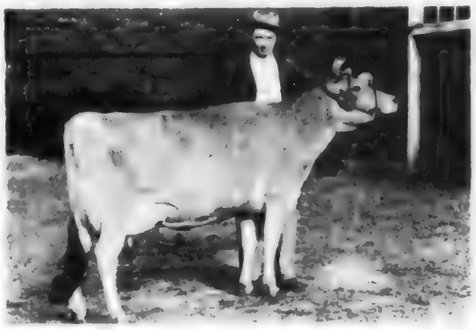
The Kimberly-Clark Corporation, Neenah, Wisconsin, offers an informative booklet: "Instructions for installing 'Kimsul' insulation in Quonset Buildings," which is a readable version of what Navy men in the tropics and in Alaska followed when installing 'Kimsul'. This type of insulation comes in rolls, like a blanket, and it is made from wood fibers impregnated with asphalt; 1,000 square feet weigh 115 pounds; available in thicknesses of one-half inch to two inches.

If you enjoy mathematics and wish to estimate the amount of insulation you will need in a metal building, you can try your hand at it by writing the Insulation Board Institute, 111 W. Washington Street, Chicago 2, Illinois, and requesting a copy of their booklet, "Farm Building Insulation". The appendix to this booklet gives the formulas to use, and sample problems.

Storage for Apples and Cows

Metal pre-fabs are used for every farm building purpose. Albert Miller, Route 1, Traverse City, Michigan, is a large grower of apples as well as a stock farmer and his barns were destroyed by fire. He needed a building to house stock, farm machinery and provide storage space for apples through the winter, and, as you would

JERSEYS . . . THE BREED OF OPPORTUNITY



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FIRST—In Numbers (42% of All U. S. Dairy Cattle)
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THE AMERICAN JERSEY CATTLE CLUB

COLUMBUS (15) OHIO

imagine, he was definitely interested in a fireproof building.

The local Quonset dealer, George Drew of the Grand Traverse Construction Company, advises: "We erected for Mr. Albert Miller a 72-foot long Quonset 24 (24-foot wide building) on a foot thick, foot high concrete wall. Besides the building proper, we built along side, and attached to the Quonset proper, a lean-to shed effect. It is made of Stran Steel 9″ x 24′ joists and covered with corrugated Quonset metal sheathing. This is used for truck loading and storage.

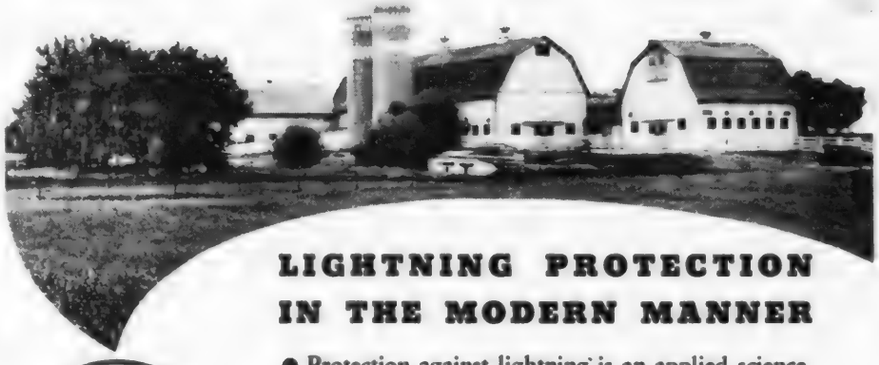
"Miller keeps his stock on the lower floor of the building and stores his apples on the upper portion. There is a reinforced concrete floor supported by steel beams. The floor is strong enough for tractors and truckloads of apples to drive on. There is storage space for 4,000 bushels of apples.

"We estimated the humidity at 54 and Miller wanted the building protected against an outside temperature of 10 degrees below zero.

"To do this, we insulated with two-inch thick, 48-inch wide "Kimsul" insulation nailed to the Quonset purlins and held in place to the corrugated metal by means of stretching wires horizontally to the ribs. The Navy used "Kimsul" to insulate Quonsets; especially in the Arctic. And what's good enough for the Arctic is good enough for Michigan, I say. The Quonset is adaptable to various forms of

SECURITY SYSTEM

Keeps Lightning Away



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Successful poultry and livestock producers know the value of using high quality feeds. That's why you'll find them buying Tuxedo regularly. They know that every bag they receive contains carefully selected and tested ingredients, to provide the necessary vitamins, proteins, minerals, carbohydrates — properly proportioned, uniformly blended.

Feeding Tuxedo is the easy way, the progressive way to feed for maximum results. See your Tuxedo dealer—you'll buy with confidence and feed with pride—knowing that Tuxedo Feeds are always dependable.

The Early & Daniel Company
Cincinnati 2, Ohio
Established in 1881

TUXEDO FEEDS

FOR PROGRESSIVE FEEDING OF LIVESTOCK AND POULTRY

insulation, and we used this method only because we are familiar with it. There are about three hundred other Quonset dealers around the country, and I am sure they employ other methods with equal success. The total price of this building including the foundation walls, windows and floor was $7,862."

Fire, Fire!

Jacob Pillar, of Manhattan, Kansas, whose barn caught fire from an undetermined origin, says: "Just once in your life something like that has to happen, and then you'll never build anything but a metal barn." Insurance rates for farm steel buildings are not as low as you might think, for no building is more fire-proof than its contents. They are, however, lower by 25% in some states than the rates on wooden buildings. The Home Insurance Company, 309 West Jackson Boulevard, Chicago, Ill., is now undertaking a study of the subject through their extensive hail and windstorm department.

Perhaps the largest farm operation in America from prefabricated metal building is Curtis Candy Farm, at Dundee, Ill. Mr. Dennis, the farm manager, says:

"We got quite an operation here, 10,500 acres, and I handle Unit No. 40. If I had my choice of buildings to shelter live stock, I'd go for metal pre-fabs. We've never had a condensation problem here, but when the job was put up there was no hit and miss.

"The walls of our buildings are concrete with very large double windows; ¼ inch thick with a 3 inch air space between the panes. The ceilings are metal. Electric fans, operating off thermostats take out the air when it gets too hot. With 60 cows in one of the barns, we run up inside temperature of 60° easy. Then the fans pump out the hot air.

"I like metal pre-fabs because they look better, and hold up easier, and, of course, chiefly because there's less fire problem."

Is a Frank Lloyd Wright in the House?

The steel fabricating manufacturers, with but two exceptions, are using steel as farmers for five thousand years have used wood. Metal can be bent and a light arch can support tremendous weight. When the special qualities of metal are used to the fullest extent the building is a functional structure; that is, its shape develops from the purpose for which the building will be used instead of growing out of the traditional shape of a wooden barn or crib or a milk house. The possible shape of things to come is being created and torn down and created new again by the non-profit John B. Pierce Foundation at Raritan, New Jersey, where farm buildings of metal have been built that look like nothing a cow has ever seen. Behind it all, is the motive power that form should follow function instead of conventional design.

But for today, on every farm that has a grain, tool or animal shelter problem, there is a steel pre-fab that may well do a life time job for you.

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ELECTRIC FENCE CONTROLLERS

Electro-Line is built for farmers who appreciate fine farm tools. Year after year more farmers choose Electro-Line because they know it is sturdily built for long life, has a powerful but safe intermittent shock, and low operating costs.

Electro-Line — the scientific farm owner's choice.

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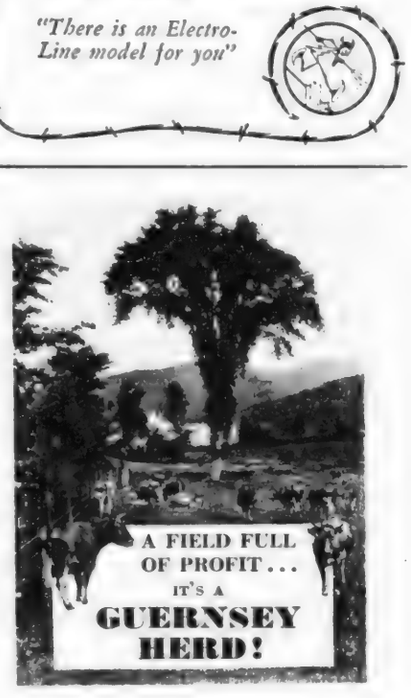
"There is an Electro-Line model for you"



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706 GROVE ST., PETERBOROUGH, N. H.

THE AMERICAN GUERNSEY CATTLE CLUB

THE IMMACULATE PIG

(Continued from page 59)

them while feeding. In this second hog they rapidly come to, and as soon as they have hatched begin making the animal miserable. Parasites are easiest to kill when they are just eggs on the ground. If these pests get no new host within a couple of years, and the ground is cultivated, sunlight will kill them.

Not only the pasture in this field should be clean, but also their houses, feeders, and drinking fountains should be scrubbed and disinfected.

There should be a separate box for every family in the field. It is better too, not to crowd all your sows and pigs into one lot. Keep them separated into communities of three or four sows and their pigs.

These pastures should be tightly fenced. If the pigs are allowed to run back and forth to an old hog lot, or up and down the lanes they may come face to face with a flock of parasites and upset your whole plan for a cleaner farm. Many hog farmers have movable fences that are strung on steel posts and moved every spring to the new meadow.

Virgil E. Jordan, of London, Ohio, doesn't even allow his hogs on the same side of the farm that hogs inhabited last year. This disappoints any diseases or parasites that may be lying in ambush along last year's fencerows. "We move them clear across the farm," he says. "I've raised hogs for 50 years, and never had trouble with diseases. I've always kept the pens clean and seen to it that my hogs got clean pasture."

He and his grandson Charles, who operates the farm with him, lost only two pigs last season. They expect to raise every pig that is born alive and the extra cash from these pigs repays them for the labor needed to keep their farm clean.

When spring pigs are weaned, leave them on the pasture and remove the sow. When the fall litters are weaned, the sows go back into the breeding pens, while the pigs are allowed to enjoy the pasture until cold weather comes. It is best for the pigs if they can be kept on pasture until they are four months old. Once they have reached this age they have less chance of picking up infections, and the farmer begins to see them in terms of dollars. Both spring and fall pigs can be pastured on the same field with little danger.

How to Winter Young Stock

A shed with a concrete floor is tops for a winter feeding pen for your young stock. This floor should be scraped clean every day to rid it of manure and wet straw. The bedding should be changed once a week, and the floor disinfected every month or so. It is a good idea to have an outside lot adjacent to the shed where the hogs can feed and exercise. Although this is a good place to feed, all feeds should be kept off the ground. Ground grain placed in self-feeders saves both grain and hogs.

ROTOTILLER* CULTIVATION PAYS OFF, TOO!

USE THE same power tiller that prepares seed beds in one operation, for cultivating. It pays off in time and work saved and more efficient results. For you can adjust tilling depth just as shallow as you like, even a fraction of an inch. The high speed rotary action works every inch of cultivating width. Weed and moisture control are so effective that cultivation is required far less frequently than usual.

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Pasteurized milk protects your health . . . and tastes better. Now, you can pasteurize milk at home with a Safgard Home Milk Pasteurizer . . . it has all the features of big commercial units . . . double agitation for even heating . . . automatic heating and timing controls . . . 110-volt AC operation . . . 2-gallon capacity . . . attractive design . . . write for complete details today

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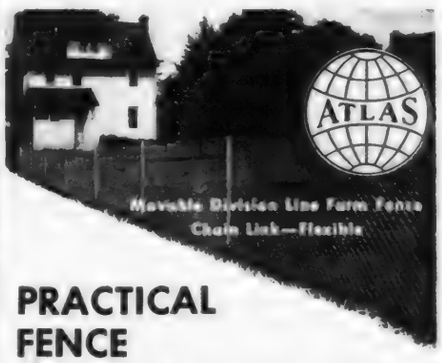

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For enhancing and protecting the beauty of fine farms and rural estates, Atlas provides the movable Chain Link, Post and Rail, and English Hurdle Fences shown here. Offices in principal cities. Catalog on request.

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Cut BRUSH, WEEDS AND TALL GRASS *Easily* *with* JARI POWER SCYTHE

This sturdy, powerful mower cuts 4 to 6 acres in 8 hours. Mows close to trees and posts, under fences and shrubbery and in tight corners. Wide 36" sicklebar cuts 1½" from ground. Twin 20" wheels provide perfect balance, make the Jari Power Scythe *easy to handle*, even on steep slopes or rough ground. Portable, economical . . . built for years of service. Ideal on farms, estates, lakeshore property, etc.

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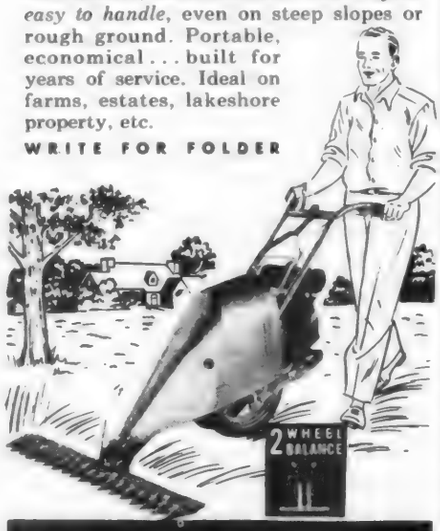

JARI PRODUCTS INC.
2934 PILLSBURY AVE. • MINNEAPOLIS 8, MINN.

The hog has long been known as a grunting garbage can, but feeding him scraps from the kitchen can be risky. Raw meat scraps often show up in the garbage, and if these scraps happen to harbor round worm eggs, you have made that parasite happy by putting him right back into his ancestral home in the hog pen.

Every Step Important

Every piece of this plan for sanitation has to be added to the picture before it is complete. Leaving out one step will rob the system of its efficiency, because the disease will out guess you and find the weak point in your program.

What Special Equipment

You need very little extra equipment to swing from mud lot pig pen to sanitary hog farming. You need either movable fences or tight permanent fences on every field. You need some inexpensive lye and disinfectant, and enough farrowing house with solid floors for all your sows. Wooden farrowing houses are not condemned to idleness under this sanitation plan. They can be cleaned and made safe for pigs, but they should have floors for the good earth is hard to keep clean.

You need not construct a special building, but for the larger herds, a central farrowing house will often save its cost in pigs and time. Any farrowing house built especially for the purpose should have a concrete floor complete with drains. Running water should be piped into the house

THE NEW
TOKHEIM TRACTOR CAB

Gives you year-round use of your tractor—in comfort! Perfect protection against sun, snow, rain, sleet. Streamline design. Safety glass windshield. Lower front, side and rear curtains roll up or may be removed in hot weather. Easily installed on tractor without special tools or equipment. All-steel construction; insulated turret top; removable metal floor enclosure. Moderately priced. Will fit Farmall H and M, and Case VA, VAC and VAI tractors. Available later for other makes.

General Products Division

FEATURES
Easily installed
No body rumble
Streamline design
Maximum visibility
Safety glass windshield
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Insulated turret top
Painted to match tractor
Year-round comfort

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Protects Flowers — Fruits — Vegetables

Black Leaf 40 kills aphids, leafhoppers, leaf miners, most thrips, young sucking bugs, mealy bugs, lace bugs and similar small insects which swarm by the millions and suck the life out of plants of all kinds.

KILLS BY CONTACT AND BY FUMES

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Insist on original factory-sealed packages for full strength.

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Spring issue	sold out
Summer issue (150 left)	50c
Autumn issue (145 left)	50c
Winter issue (800 left)	50c

Farm Quarterly, Cincinnati 10, Ohio.

THE POET SAYS in spring a young man's fancy turns to thoughts of love, but the thoughts of boys whose fancies feed on the world about them turn to the old swimming hole under the willow, the dark shade in the deep woods, and the brow of a wind swept hill. In the summer of youth the sun lies like a warm arm across their shoulders and the spring breezes caress their faces. The day is never long enough and the cares that infest the lives of grown-ups never come to rest on their small shoulders. In the country the feet of small boys always run toward happiness—never toward the corner pool room.

SPRINGTIME is Chick Time

. . . time to put your poultry operations under the Arcady Five Point Poultry Program. It's a profit-proved system for producing premium quality eggs and poultry.

Ask your Arcady Dealer or write us for information on this Five-Point Program to help you secure maximum results with Arcady Poultry and Turkey Mashes, Concentrates and Fattening Feeds.

A Feed and Feeding Program for Every Farm Need

ARCADY FEEDS
ARCADY FARMS MILLING COMPANY
223 W. Jackson Blvd. Chicago 6, Ill.

and if possible there should be a way to heat it. The farrowing house should include a stall near the entrance to serve as a bathroom, since a bath is the first thing a sow gets when she comes in for farrowing.

A One Sow Farrowing Pen

The one or two sow farmer can easily build a sanitary farrowing pen in one corner of a shed. The pen will clean up easier if the floor is concrete. This corner can be blocked off with removable hurdles that are taken out after the sow and pigs are hauled to pasture. The rest of the year no hogs should get near the shed, but there is no reason why it can't be used for storage.

The farmer who has been losing money and hogs through the years can save both. He has to battle nature for them, but when he combines a good plan of attack, with a few extra hours of work, nature stands to lose a scrap.

Parasites and disease already have the jump on the farmer for they work day and night with no time off for beer. They are pluggers that hang around until they catch the farmer with his sanitation down, then move in quietly and the next thing he knows he's losing money or out of the pig business entirely.

In the day of the hand ax and the husking bee, hog diseases weren't as potent as they are now. On the farm of the pioneer pigs could thrive on either mud or clean pasture for neither harbored many pests. Then just to make things more complicated, along came such diseases as necro, scours, cholera, and a dozen other swine miseries. Once these enemies got a toe hold on the hog country they spread out and covered it like a blanket.

These are the elements that the present day hog farmer is up against. The best weapon he has is to keep his hogs as clean as China pigs on a mantelpiece. The hogs won't mind being cleaned up. "A hog," states a successful Indiana swine herdsman, "will be clean when you allow him to be." The hog farmers who are getting today's biggest profits not only allow their hogs to be clean—they insist upon it.

Don't Forget Me

Now let's go out behind the barn where we won't be interrupted by the women and have a man-to-man talk about the practical, grass root aspects of the McLean County method of raising pigs. First, how well, and at what cost, has this system worked. Answering the first question first, many dirt farmers have raised as high as 95 per cent of their pigs. This means they had a good year and worked at it intelligently. Even if this system is religiously practiced you won't average 95 per cent. Acts of God on the farm are everyday affairs. But you have a better chance of raising 95 per cent of your pigs if you follow this system than if you use the old by-guess-and-by-gosh methods under which the national average has been under 60 per cent.

There's another consideration. Hogs are like people (or vice versa) in that the more you crowd them the more necessary become sanitary measures. A farmer would throw up the sponge in despair if he had to live by the sanitary laws of a city. Likewise, the larger your hog population per acre the more multiplied the disease hazards. Therefore, the big time hog raiser can afford to follow a system of thorough sanitation. For the little fellow, who raises a few hogs as a sideline, the need may not be as apparent nor as necessary. However, even if you have only one gilt with a litter of three, cleanliness and good management pays. Insofar as it can be practiced, within the harsh limits of labor shortages, the McLean County system pays dividends. A pencil maker who spends twenty-five cents to sell a ten cent pencil winds up in the county home; the same for a farmer who spends $2,000 for buildings and equipment to raise five litters a year is penny wise and pound foolish. The McLean County system takes work and it's not cheap, but it will pay dividends on whatever amount of money or work the hog man wants to put into it.

New-born—a healthy and normal calf!

And yet, in a few hours, deadly white scours may strike and wipe out your future profits!

Why should you risk losing a valuable calf when, at a cost of just one quarter, you may prevent white scours?

3 Penovoxil* Capsules—costing *less* than 25¢ and easily administered in the first 24 hours of the calf's life—*may keep white scours away!* Give the first Penovoxil Capsule as soon as the calf is on its feet—the other two at 8-hour intervals.

Penovoxil Capsules will also help *control* white scours in your older calves. At the first sign of scouring, give two Penovoxil Capsules three times daily for two to five days.

Get Penovoxil Capsules from your druggist. Bottle of 25 only $1.75 — economy-size bottle of 100, $6.50.

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For CHRONIC MASTITIS
(due to *Streptococcus agalactiae*)

Use Squibb Novoxil* Liquid, during the dry period — the best time to treat an infected udder. Each bottle of Novoxil Liquid contains enough to treat six quarters, with two injections each, while the cow is dry. Get it from your druggist.

For LOCAL INFECTIONS
(in livestock)

Use Novoxil Ointment. It is highly penetrating and promotes *sustained* healing action. Not "just another ointment"—it really does the work! Ask for it at your druggist's.

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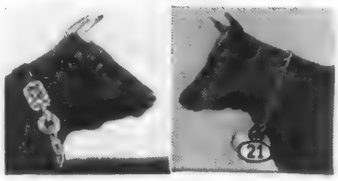
PROTECTED BY 10 U. S. PATENTS
Delivery one to three days, postpaid. Furnished assembled with adjustable chain. Large numbers on marker black inlaid. Neck Chains locked by key ring fasteners. All chain is brass plated.



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No. 25 All Chain, Double Plate Marker. Marker Plates SOLID BRASS.....Price $14.50 per doz.

State breed of cattle when ordering. also numbers desired.

Sample mailed for $1.00

Write for folder which includes our No. 16 Combined Bull Marker and Controller. .....Price $4.50

GOLDEN ARROW FARMS

Dept. 11, Box 7, Huntington, Indiana.

OATS

(Continued from page 67)

hazards may knock this practice into a cocked hat, some seasons, but on the whole combining oats seems to be here to stay.

Direct combining certainly was not dependable with the older varieties grown up to 5 years ago. It is far safer with Cedar, Tama, Viking and the new champ, Clinton, described as superior in every respect for large parts of the Corn Belt, with its strong, stiff, healthy straw that lends itself to direct combining. This is beginning to approach a farmer's harvest dream, but even with Clinton, combining as soon as permissible is recommended because the straw of oats is less resistant against weakening by prolonged weathering than is that of wheat, and the grain is also more subject to loss by shattering. Because of these drawbacks, many farmers will prefer the windrow and pick-up combine combination.

When to Harvest

Combining should begin ordinarily when all greenness has left the straw and the glumes turn a dull white. When harvest time approaches, these new varieties appear riper than they actually are. It is a wise precaution to have a sample of the grain tested for moisture at a local elevator before combining begins.

To obtain the maximum yield, it is necessary to delay harvest until the grain reaches the hard dough stage. If cut earlier, the translocation of substance from the stems to the grain will not have been completed, resulting in lighter test weight and curtailed yield. Loss from this may be rather serious, as much as 10 to 15 percent. This loss is greater for the tennant or land owner who has no livestock to consume the straw, for greater feed value of the straw may partly offset the decreased grain yield. If the oat straw is to be saved for feed, harvesting with a binder is likely to prove most attractive at the present stage of farm machinery development and availability.

It is unsafe to store threshed oats in the bin before the moisture content of the grain has gone down to 14 percent. Higher moisture may cause heating, mustiness, and loss of viability. This results in reduced feed and food value and market price.

Oats and the Horse

A race horse is a highly specialized product and no cost is spared in feeding him what is best for his health and performance. Oats have been found to be the basis of his best ration from the time he is weaned until he is ready for the glue factory. W. P. Garrigus, of the University of Kentucky, who knows as much about how to keep a race horse in trim as anyone in the country, has this to say of oats as a feed for horses:

"Race horse folks disagree on many things, including the best sign of the Zodiac by which to wean their foals, but they are unanimous in their agreement that heavy, clean oats are the best grain for race horses from start to finish. Thoroughbreds start a lifelong acquaintance with oats at from eight to twelve weeks of age when oats are placed in creeps and the foals are allowed to eat as many as they want. From that time until the end of their days they will receive a grain ration composed of at least 50 per cent oats.

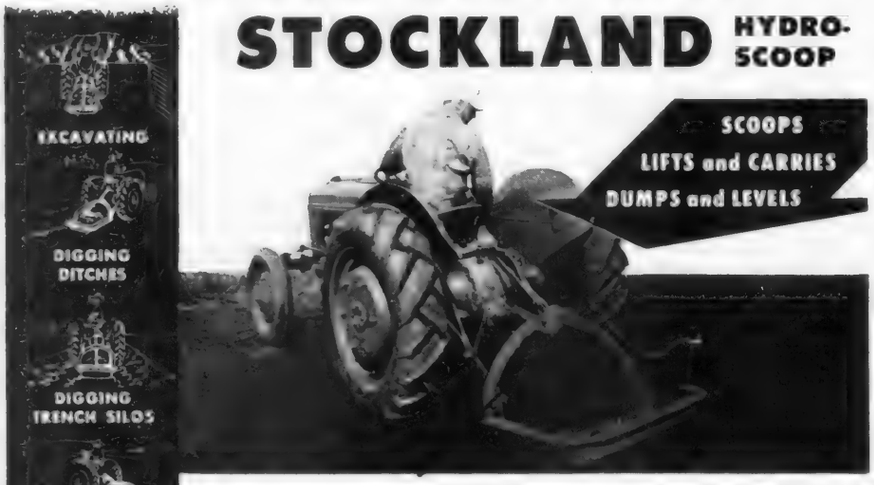
"Some horsemen also add high priced complex mineral mixtures and vitamin preparations but most horsemen consider these to be 'shotgun remedies' to be used only as a last resort when other measures have failed."

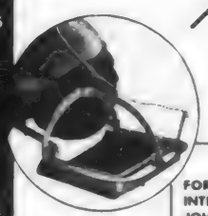
That New Oat Disease

The season was right for a record crop of oats in 1946. Then along came a new disease, Helminthosporium, which is as formidable as its name. In some areas the crop was cut in half. A blight and root-rot disease, it's been hanging around the country on certain grasses for years, but the older varieties of oats had become resistant. It attacked almost all the new varieties, caused shriveled grain, and many seedlings died before they got started. Of the new varieties, Marion, Clinton and Benton seem to have enough stamina to resist Helminthosporium. If these varieties cannot be obtained, and seed will be very scarce, the best bet for 1947 is to plant the old varieties or plant only Ceresan-treated seed of the new varieties obtainable.

It's easy to do your EXCAVATING with

STOCKLAND HYDRO-SCOOP





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35 June Bearing Plants
15 Everbearing Plants
} *Total 50 plants for* **$6.00**

"None So Delicious as Home-Grown"

Just the right quantity of each type for the average home garden. Only the best of varieties used in this collection. Shipped anywhere in the U.S. by express collect. Complete listing of all varieties including the sensational new everbearer, *Streamliner*, and prices featured in our 1947 General Seed Bulb and Plant Catalog FREE on request.

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PRACTICAL LIVESTOCK BREEDING

(Continued from page 74)

her mother and sisters are all very poor milkers. I raise all the calves on nurse cows, and can well afford to, because they are all tops." One might say, "Here is a profitable venture." So far as this particular breeder is concerned it is true, for the bulls from these cows sell into the thousands of dollars. What of the time when the blood of these bulls is incorporated into the breeding of a commercial herd? That is their ultimate end, and the man on the range, or the feeder breeder certainly cannot afford to keep two cows to raise one calf.

Pen 15 Program

A profitable commercial breeding program has been carried on in the Blue Grass region of Kentucky where the Kentucky Extension Service representative, Richard C. Miller, has been working with farmers to show them how to size up their market and produce animals to meet the demand.

Henry Besuden, a six-foot-two Kentuckian, who runs 500 sheep on his farm near Winchester, has helped make "Blue Grass Lamb" one of the choice entrees on the menus in New York hotels. In December, 1946, his car-load of 55 Kentucky lambs won the first prize for that class at the "International" in Chicago. He is well paid for his time and effort; his lambs, like those from other good farms in central Kentucky will bring a higher price than the top of the Chicago or Cincinnati market. And he, along with other intelligent sheep men in Kentucky, have produced the lambs that have brought the packer buyers to the Winchester, Paris, Lexington and other Bluegrass stockyards. The market demanded lambs with tender, firm, fine grained meat, of a size that

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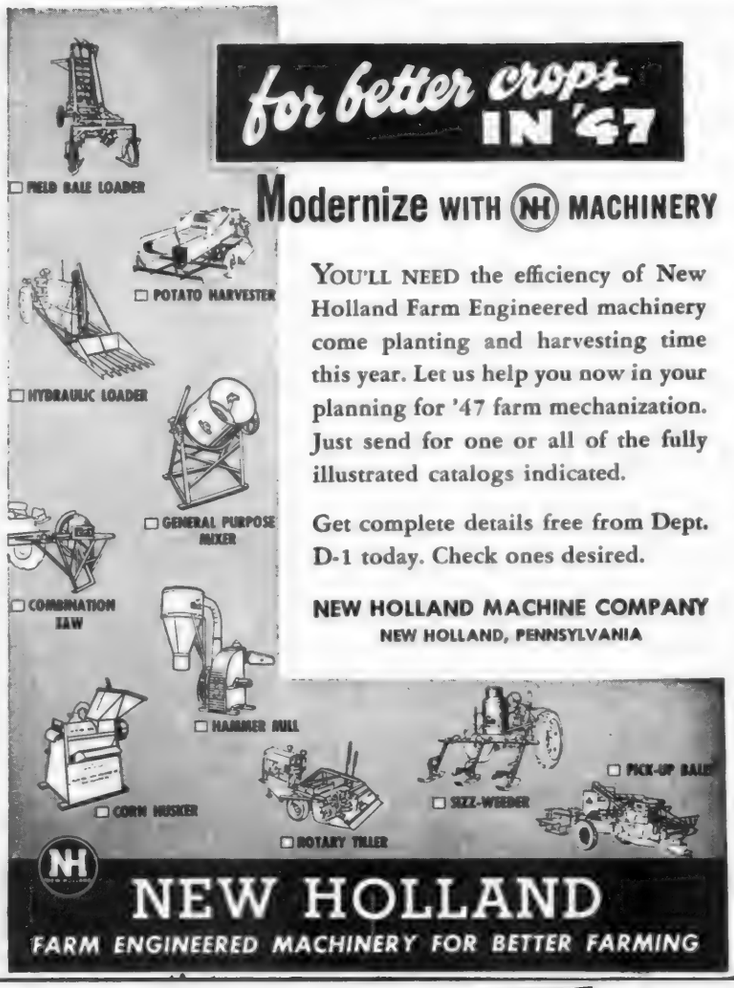
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would permit the leg of lamb to be handled in the average home roaster.

Besuden tells the story of how Kentucky sheep men developed these lambs by a process of breeding which was strong on trial and error. He says, "At the time I got interested in sheep 18 years ago, the supply of Kentucky mountain breeding ewes was drying up. Farmers had been bringing them down from the mountains of eastern Kentucky and Tennessee, breeding them to a good ram, and sending them to market at 5 or 6 months old. So we began looking around for a good consistent source of breeding ewes. Sheep men traveling through the west found the Montana ewes were ideal for our set-up. They were big, hardy animals, generally cross-breeds, containing Rambouillet and Hampshire blood, shearing 8 to 10 pounds of wool. They were good milkers, which meant their lambs would get off to a good start in February. And, most important, there was a good supply of these ewes. We now breed our Montana ewes to fine Southdown rams to produce Kentucky spring lambs.

"Over the years I have my breeding and handling program worked out so I get a good percentage of my ewe and wether lambs in Pen 15 or another top pen at the Winchester stockyards. Pen 15, along with several others, is reserved for the top lambs and the packer's representatives make their first and highest bids for these lambs."

Using his hands to describe the jabs the packer's buyers make at lambs to find out what's under the wool, Besuden said, "I grade my own lambs here at home; I want every lamb that goes in my pen to be a top lamb. Buyers have the habit of picking out the poor lamb in your entire lot, making one poke at its ribs and then bidding on all your lambs based on its faults. To be of top quality a lamb should weigh around 85 pounds, and be finished in 4 to 5 months. It should be blocky and well filled out over the hindquarters, the loins and the ribs. The fleece should be good.

"My feeding schedule for the lambs is flexible," says Besuden, "but the average year it goes something like this. The lambs start on their ewe's milk and may pick up a little hay and grain in the barns in February. From March 1 to May 1 they are on Balbo Rye and Bluegrass with the ewes. From about May 1 to June 10 they are on mixed clover pasture. Then from June 10 to market time they are finished on the Korean Lespedeza as it appears in the pasture. They are usually weaned by July 15 and ready for the market within a few weeks."

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The first essential in profitable commercial livestock operations is the use of good sires. There is a lot of truth in the quip, "No one but a millionaire can afford a poor sire." The modern pace is too fast and the cost too great to attempt to breed up profitable herds and flocks from scrub foundations.

The question has often been asked, "What can one afford to pay for a sire?" Naturally, the owner of a pure bred outfit can afford to spend more than the commercial operator. How much of an outlay can profitably be made depends upon the number of females to be mated and the possible outlet for the progeny.

Some years ago $15,000 was paid for a bull by a friend of ours, an experienced breeder. This was in the midst of the depression and a huge sum for the time. The offspring from this bull have averaged well over a thousand dollars a head. He has produced over 150 calves, or a very profitable return on even a $50,000 investment. The calves from this bull have never reached the limit paid for the sire, but have sold up to half his purchase price. Their sons, in turn, have averaged considerably more than the average, and one has produced a son that would outsell his grandsire if offered. It would be a conservative statement to say that the sons of the $15,000 bull are producing offspring that sell for around $1,000. Their sons, bringing $400 to $500, are going out into the commercial herds of smart breeders where the progeny are showing a $25 to $50 a head greater profit than the average feeders when sent to market. Each breeder purchasing these animals chose the best he could afford, and by selecting proven ancestry, had a profitable venture.

The best plan is to select animals that have, consistently, for generations had those qualities that are desired to be reproduced. Retain only those who perpetuate these qualities. Use the breeds adapted to your own soils or climate and the available feeds. Visit your markets, study the demands of the consumer and try to anticipate his future needs. To those who do this, livestock production has been and will continue to be a profitable enterprise.

(Continued from page 69)

A BARN OWL consumes about three pieces of prey and then regurgitates the indigestible fur and bones in a pellet as shown here. A mouse skull shows between the fur.

for the owl to fly within striking distance of a rat or a mouse before the rodent's sharp ears pick up the sound of the wing beats of the predator. The exceptionally long legs are armed with four toes, only two of which usually curve forward—a contrast with the feet of perching birds such as robins, wrens, and warblers, which grasp with a three and one arrangement. In keeping with other members of their tribe, barn owls have needle sharp claws which are ideally adapted for piercing skin, flesh, and the vital organs of their victims.

When hunting, the birds sight their prey either from a perch such as a dead tree or a fence post or see it as they fly over some field or thicket. The kill is made with the talons alone. The owl closes these neat meat hooks with a terrific force which is exerted by the contraction of a network of powerful ligaments. Victims which are too large for newly hatched owlets to swallow whole are ripped apart by the parent's hooked beak. The beak is also used for holding prey just before it is passed on to the nestlings. In bringing rats and mice from the place of capture into the nesting site, however, the feet are used for toting the rodents.

Barn owls range from coast to coast and border to border. They roost and nest in such places as caves, hollow trees, church steeples, and barn lofts. Frequently the same nest will be tenanted by barn owls year after year. I knew of a giant cottonwood which had been occupied by these birds for fifty years. Doubtless when one of the old owls had died the other had secured a new mate, and thus the chain of occupancy was kept going until the tree was blown to the ground three years ago.

Their habits make it an easy matter to determine accurately the diet of the barn owl. In consuming their prey they

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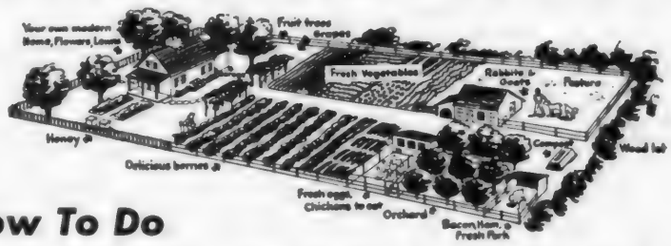

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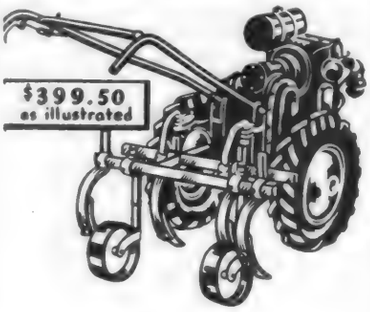

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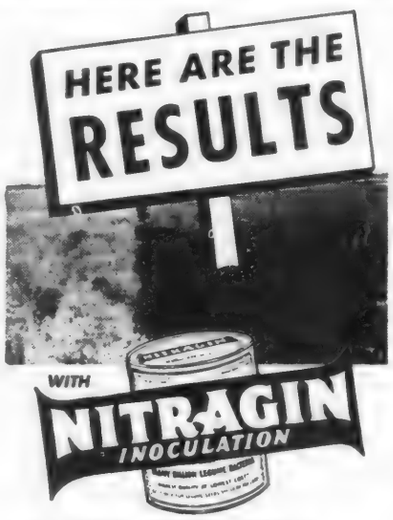

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make no effort to tear it into bits—they simply swallow it whole. Even the young do this. After they have consumed about three or four items of prey in this manner, the indigestible parts, including the bones, hair, feathers, and scales, are formed into balls or pellets and regurgitated. The pellets are about an inch in diameter and two and a half inches in length and it is an easy matter to collect them from a nesting or roosting site. By tearing them apart and identifying the skeletal remains it is a simple matter to estimate the barn owl's value to the farmer.

The skulls of meadow mice were the commonest remains encountered, since they accounted for about eighty per cent of the total. From my hiding place in the loft I saw the parents bring seven of these mice to the young, three of them within forty-five minutes. These short-tailed rodents became excessively abundant during the winter of 1935-36 and destroyed by girdling $750,000 worth of apple trees in the orchards of New York and Virginia.

A hungry young barn owl can consume half a dozen mice in rapid succession. Curiously enough there was no evidence that these owls had eaten poultry on the Morris farm although there were young chickens and ducks in nearby pens. Owls feed at night when barnyard fowl are on the roost and the doors are locked.

Other investigators have proved the owl's value more effectively by examining hundreds and even thousands of pellets. The late Dr. A. K. Fisher, for example, identified 425 skulls from two hundred pellets collected in a tower of the Smithsonian Institute, Washington, D. C. One of these was of a vesper sparrow. The others were all small mammals including 225 meadow mice, 179 house mice, and 20 Norway rats. From January, 1930, until June, 1932, Arthur Stupka, now Chief Naturalist for Great Smoky Mountain National Park, carried on an investigation of the food habits of the barn owl in Ohio. He examined more than 12,000 pellets and of these 89.65% were the remains of mice and rats. Birds, bats, shrews, weasels, moles, cottontails, and flying squirrels made up the balance.

Given more encouragement and less buck-shot the barn owls will carry their open warfare to the fields and orchards all over the country. They are great travelers and once the young leave the nests they fly great distances before they finally settle down to raise a family. Four young barn owls from the nest on the Morris farm were banded and within two years three of them had been shot by people who like to shoot things. One was killed in Alabama, one in Georgia and the third in Arkansas.

If a pair of big white winged owls start circling around the barn some evening at dusk give them an "all clear for landing" signal and hope that they will come in and take up housekeeping.

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A COMPLETE WELDING SHOP FOR THE FARM

Mid-States METAL ZIPPER

The Mid-States Metal ZIPPER with accessories and attachments shown below, equips the farm with a complete welding shop. Permits welding, heating, brazing, cutting, bending, soldering and all other operations. No need to go to town and wait for expensive repairs. Do it yourself right on the farm with a Metal ZIPPER.

Ease of operation and automatic arc permits any farm hand to do good welding right from the start with a Metal ZIPPER. It's the one arc welder that works perfectly without the guidance of an expert.

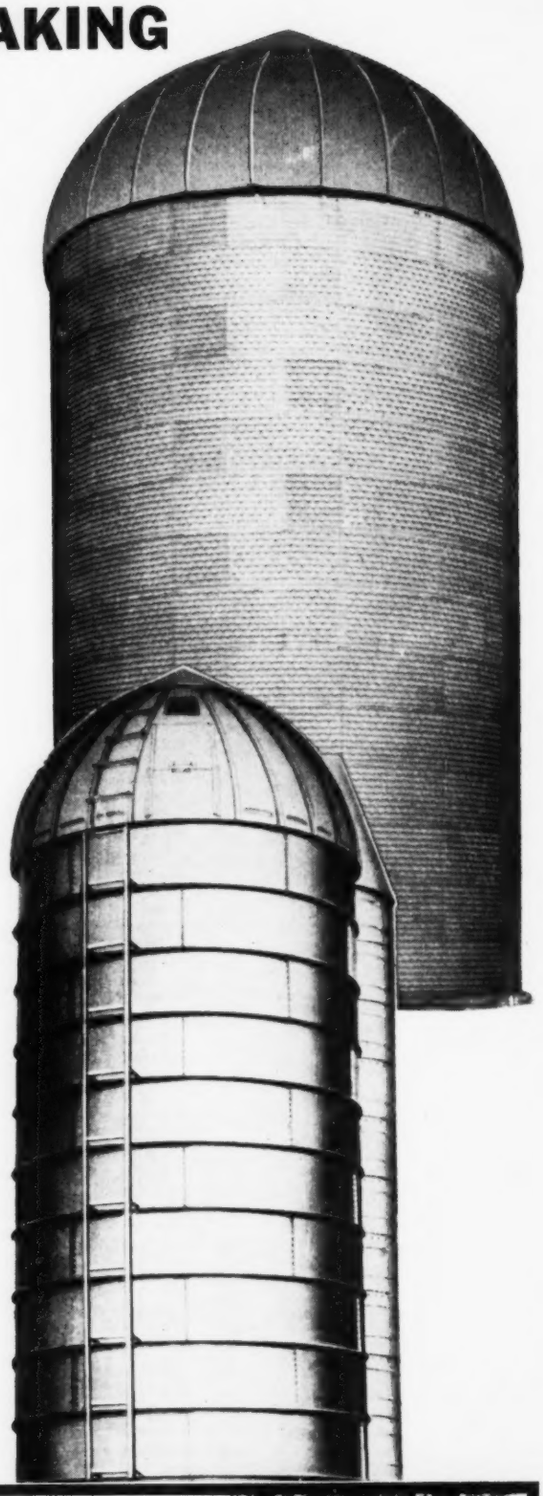
For quick, easy repairs and to avoid costly delays, maintain your farm machinery and equipment with a Metal ZIPPER.

The Metal ZIPPER illustrated above with attachments is built to withstand rugged use. It's portable . . . wheel it about with ease. Lengthy cables, helmet and all other accessories and parts are of highest quality. 9000 Arc Torch provides a low-cost electric flame which is approximately 2000° hotter than acetylene. No need for dangerous gas welding equipment. Do it all right on the farm, with this best of all, easy to operate arc welder . . . the Metal ZIPPER. Write for complete facts today . . . no obligation.

Ask for the Name of Your Nearest Mid-States Dealer

Mid-States EQUIPMENT CORPORATION
2427 South Michigan Avenue, Chicago 16, Illinois

THE LAST WORD IN HAYMAKING



The value of hay depends on the way it is handled and cured. This amazing new Martin method of haymaking produces hay with the highest nutritive value and is equal, for all practical purposes, to hay made in a dehydrator. It is highly palatable, quickly and easily digested which results in much greater consumption. As high quality hay is the best and cheapest cow feed we have, this greater consumption means more milk per cow and at lower cost.

THE NEW WAY MAKES BETTER HAY. Hay may now be gathered with a minimum amount of field drying and placed in a Martin Haymaker. It is dried by means of a blower and the hay produced is green and fragrant, retaining its leaves and maximum value of carotene and vitamin A.

THE MARTIN WAY SAVES MONEY. The Martin Haymaker can be filled with chopped hay in about one half the time and one third the cost of putting hay in the mow. There is also a saving of insurance cost by elimination of fire hazard.

THE MARTIN SILO is an important part of the feed storage system. It is ideal for grass silage and insures better silage without leakage. Minimum waste—rugged construction designed to withstand any strains.

MARTIN STEEL-BILT BARNS provide an ideal and efficient combination used with Martin Haymakers and Silos. Labor saving, long lived, convenient, comfortable quarters for stock summer and winter.
Martins are pioneers in the manufacture of Steel-bilt buildings of all kinds. All buildings are farm proved. Inquiries will receive prompt and courteous attention. Write or mail attached coupon.

STEEL MARTIN Farm Buildings -BILT

PIONEER MANUFACTURERS OF — HAYMAKERS • SILOS • CORN CRIBS • DAIRY BUILDINGS • FEED STORAGE BUILDINGS • POULTRY HOUSES

MARTIN STEEL PRODUCTS CORP.
119 Longview Ave., Mansfield, Ohio

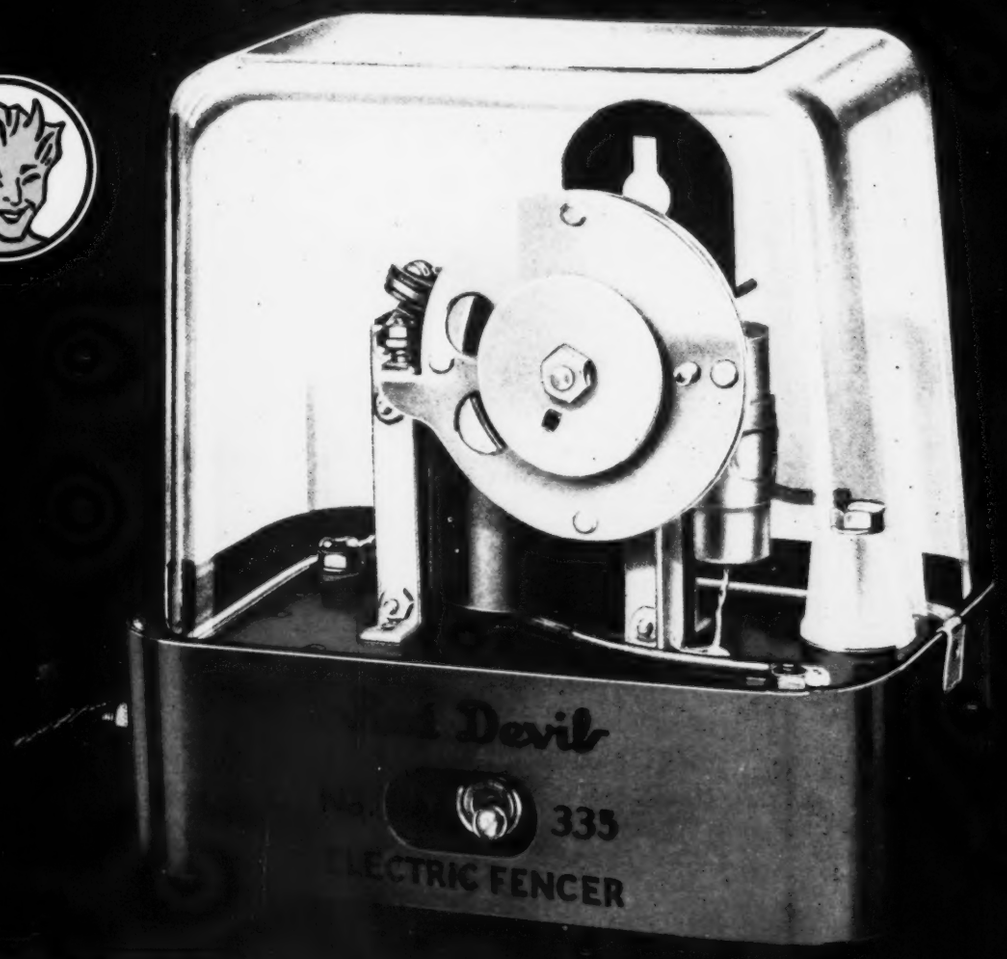
Please send me, without obligation, full information on the following MARTIN METAL FARM BUILDINGS

TYPE OF BUILDINGS

NAME

STREET OR R. F. D. NO.

CITY AND STATE



No. 335
(EF1)
IT'S TOPS
at your dealer

On-off On-off

Timed like a pulse beat—to increase effectiveness of shock and greatly lengthen battery life.

The No. 335 RED DEVIL ELECTRIC FENCER, with its new "wheel" type contact, uses current only instantaneous—centrifugal force does the rest. The revolving wheel is the only moving part—its rod and bearings are of stainless steel for long wear.* Standard platinum contact points are readily replaceable.

Uses any 6-volt hotshot battery.

Strong, clear glass top permits you to "see it work" at all times.

Sealed to discourage tampering and to bar the elements. No radio interference. Nothing to oil or grease.

The real low price discourages imitation—demand the genuine RED DEVIL for guaranteed performance.

Since 1870

Genuine Red Devil Battery Operated ELECTRIC FENCER *for safest performance*

THE new No. 335 Red Devil combines all the exclusive advantages that made the pre-war model so popular in the confining or rotating of livestock by means of a single wire fence.

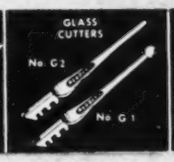
Being battery operated, the No. 335 offers the advantages of absolute safety. The voltage is high, yet the amperage is low and the intermittent stinging shock, although many times more effective, can do no physical or mental harm to livestock or human. The No. 335 is not affected by powerline failure.

The intermittent action explained to the left makes the No. 335 Red Devil a real "juice miser." The working parts are sealed against moisture—rain, hail, sleet, snow or fog cannot interfere with its perfect operation. Only one moving part, nothing to wear out.*

Unconditionally guaranteed against defective parts and workmanship. Comes completely packaged in strong carton (except for 6-volt battery) including battery clamps, fence connectors, screws, template, switch, bracket for hanging, battery wiring, Instruction Sheet and Diagram. . . . Demand the original and genuine Battery Operated RED DEVIL No. 335 (EF1) Electric Fencer, at your dealer.

***A product of* Red Devil Tools.**

IRVINGTON 11, NEW JERSEY, U. S. A.

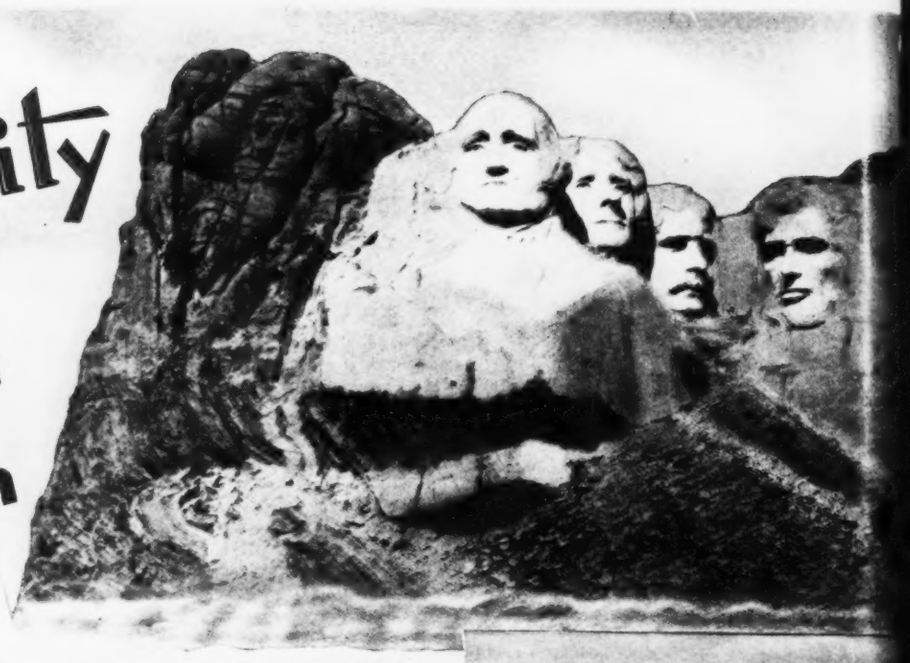


Coming Soon

Combination Battery and Highline Model

For Dependability

Men with a Mission



Men like Washington, Jefferson, Lincoln, and Theodore Roosevelt live in memory not because their images are engraved on mountains but because they served mankind so well that they now live in history as "Men With a Mission." They won this honor and distinction because of their vision, courage, devotion, and *dependability*.

Farmers too have a great mission—an increasingly important mission in this modern world. To provide food, fiber, and oils for all mankind is but a part of that mission. To provide these necessities of life year after year, the modern farmer realizes how important it is not only to preserve the soil but to improve it. Conservation is as much a part of modern farming as production.

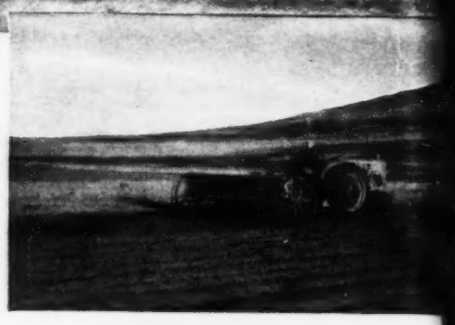
Progressive farmers employ Modern Methods of crop rotation, fertilization, and cultivation to maintain or to increase the fertility of the soil—mankind's greatest natural resource. Knowing that a workman is no better than his tools, farmers everywhere are turning to MM machines because they know that MM Modern Machines, Tractors, and Power Units are outstanding for *efficiency*, *economy*, and *dependability*.

MM Modern Machines are BUILT TO DO THE WORK with greater ease and at lower operating and maintenance costs. Rigid high standards of engineering and manufacturing reward the modern farmer with *quality* machines of proved dependability.

Get all the facts on MM Visionlined Tractors, The HARVESTOR, The Bale-O-Matic and many other dependable MM Machines—Modern Machines designed for the safety and convenience of the operator. Look to MM for highest quality Modern Machinery. They are worth waiting for!

MINNEAPOLIS-MOLINE is proud to be SERVING THOSE WHO SERVE MANKIND ON FARMS.

MM Visionlined Universal "U" and MM Hi-Klearance tractor plow.



Moline-Monitor drills are famous for accurate seeding at uniform depth.

MM Visionlined Universal "U" and world famous MM Wheatland disc plow.

Above: MM Self-Propelled 12-foot HARVESTOR.

Below: MM Windrower and Universal "R"

Above: MM Wheatland disc plow preparing seed bed.

MINNEAPOLIS-MOLINE
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA, U.S.A.

Below: MM HARVESTOR with pickup attachment and MM Universal "U".

Below: MM Universal "U" and MM TRA disc plow.

MM Power Units have many uses. Here is one pumping water for irrigation.